Appendix B

GEOGRAHIC INFORMATION SYSTEM PROCESSING INFORMATION AND METADATA SUMMARY

Projection Information: All of the coverages used in the GIS Analysis were either originally in Teale Albers projection or re-projected from their original projection or coordinate system to Teale Albers.

POSC:	-1
UNIT:	Meter
GEOGRAPHIC CSYS:	GCS_North_American_1927
DATUM:	D_North_American_1927
PRIME MERIDIAN:	Greenwich
FALSE EASTING:	0
FALSE NORTHING:	-4000000
BASE PROJECTION :	Albers
CENTRAL MERIDIAN:	-120.0
CENTRAL PARALLEL:	0.0
STANDARD PARALLEL 1:	34.0
STANDARD PARALLEL 2:	40.5

1. Hydrography: Derivatives of the US EPA's Reach File 3-alpha version (RF3a) were the primary hydrographic coverages used in the GIS analysis. Various subsets of the data were used to eliminate lower order stream segments and "coarsen" the coverage for different presentation and geographic analysis purposes. However, the underlying geographic and attribute data remained unchanged. Apparently, this coverage was prepared under a collaborative effort by the Teale Data Center, US EPA, and the CA Dept. of Fish and Game. The shapefile used for LJSR GIS analysis was extracted directly from the GEO Waterbody System library (on CD) prepared by Teal Data Center for the SWRCB and the nine RWQCBs. The data was provided in a Teal Albers projection so no re-projection was needed. The accompanying metadata is on pages 9-36 of this appendix.

2. Roads: The roads layer was extracted directly from the GEO Waterbody System library (on CD) prepared by Teal Data Center for the SWRCB and the nine RWQCBs. The data was provided in a Teal Albers projection so no re-projection was needed. The layer was used primarily as a background for use in putting perspective to locations within the area of interest. The roads layer includes all major highways and freeways throughout the state, and was clipped to only those roads within the study area.

3. Counties: The county layer is from a statewide county coverage developed by the Teale Data Center. This coverage was clipped to contain the counties in and around the area of interest. It was used to define the boundaries of much of the study area and as a background reference

to see which jurisdictions are located within each of the sub-areas. The Teale Data Center metadata for this coverage is on pages 62-66 of this appendix.

4. Land Use: Land use Data was developed by the State of California, Department of Water Resources. The Department of Water Resources provided the Regional Board with five individual Arcview shapefiles. Each shapefile contained land use information for one county including Merced, Madera, San Joaquin, Stanislaus, and Fresno counties. Originally, all shapefiles were received in a custom Transverse Mercator projection used by the Department of Water Resources. The five shapefiles were re-projected to a Teale Albers projection using the Arcview projection utility. The five shapefiles were trimmed (clipped) down to county boundaries then merged to create one contiguous land use coverage using the Arcview GeoProcessing Wizard. The Department of Water Resource's Metadata for each of the five land use coverages is on pages 36-62 of this appendix.

5. Wetlands: The wetlands data is based entirely on the California Central Valley Wetlands and Riparian GIS project (see Metadata pgs. 66-73). The data was obtained electronically from the Fish and Game website as a raster based file. The raster file was converted to a vector (shape file) file using Arcview and Spatial Analyst. The file was then clipped to the shape of the Grasslands Ecological Area (Refuge Boundary see 7 below).

   The Grasslands Ecological area wetlands were broken down by sub-area to determine the acreage of the GEA in within each sub-area. Three wetland classification types were extracted from the GEA wetlands (Open Water, Seasonally Flooded Palustrine Emergents, and Permanently Flooded Emergents). These classifications were assumed to characterize the areas of ponded wetlands. Each of these three components were summed together by sub-area to determine the total acreage of ponded wetlands within each sub-area.

6. Refuge Boundary: The refuge boundary for the Grasslands Ecological Area (GEA) was downloaded from the U.S. Fish and Wildlife Service's (USFWS) National Wetlands Inventory website (http://www.nwi.fws.gov) using the Wetlands Interactive Mapper Tool. The coverage was originally obtained as an Arcview Shapefile in UTM Zone 10n projection and was re-projected to Teal Albers for analysis with other coverages. Once re-projected, the shapefile was edited on-screen in Arcview to include state wetlands that appeared to be left out of the refuge boundary coverage. Editing of the shapefile was done using a combination of staff knowledge of the area, inspection of maps, and identification of local landmarks, using topographic maps and EPA's reach file 3 in the background. Therefore, the refuge boundary coverage should be considered very coarse. No Metadata was provided with the specific refuge boundary coverage downloaded from the USFWS's National Wetlands Inventory website, however, general metadata for the National Wetlands Inventory is on pages 74-96.

7. Public Water Agency Boundaries: The water Public Water Agency (water districts) boundary coverage was obtained from the Ken Winden (kwinden@water.ca.gov) with the

Appendix B

Department of Water Resources. No formal metadata accompanied the coverages, however, the following information was given.

Digitized scale: 1:24,000
Coordinate system: UTM Zone 10
Datum: 1927
Units: Meters

The coverage was obtained as an Arcview shapefile and was re-projected to Teal-Albers.

8. Calwater: The California Watershed Map (CALWATER version 2.2) is a set of standardized watershed boundaries meeting standardized delineation criteria. The hierarchy of watershed designations consists of six levels of increasing specificity: Hydrologic Region (HR), Hydrologic Unit (HU), Hydrologic Area (HA), Hydrologic Sub-Area (HSA), Super Planning Watershed (SPWS), and Planning Watershed (PWS). The primary purpose of Calwater is the assignment of a single, unique code to a specific watershed polygon.

   The individual numbers that were used to identify Calwater Watersheds are a combination of the following: Hydrologic Region + Hydrologic Basin (Regional Board) + Hydrologic Unit + Hydrologic Area + Hydrologic Sub-Area + Super Planning Watershed + Planning Watershed. Listed below in Table 1.1 are all of those Calwater watersheds that were either partially or completely contained within the area of interest (see metadata pgs. 97-106).

9. Area of interest: The area of interest is an accurate representation of the drainage area affecting salt and boron loads to the San Joaquin river downstream of the Mendota Pool and upstream of the San Joaquin River at the Airport Way Bridge nearVernalis site. The area of interest encompasses the drainage area contributing the majority of the salt and boron loads to the San Joaquin River at Vernalis. In general, the area of interest includes the lands draining the eastern slope of the coast range, the western slope of the Sierra Nevada foothills below the major reservoirs of New Melones Lake on the Stanislaus, New Don Pedro on the Tuolumne, and Lake McLure on the Merced, and the San Joaquin Valley Floor from the Mendota Pool to Vernalis. All of the land area of San Benito, Mariposa, Tuolumne, and Calaveras counties were excluded from the area of interest because it was determined that these areas do not contribute significant salt and boron loads to the LSJR.

   The boundary, clockwise from Vernalis, follows the Stanislaus River to the Caswell Park. It includes the entire park as well as some surrounding land that also drains into the Stanislaus River. From Caswell Park, the boundary follows a ridgeline north of which (outside the area of interest) water is known to flow downstream of Vernalis, but south of which (inside the area of interest) flows into the Stanislaus River. This ridge is followed to the fork of the Main District Canal east of Ripon. At this location, the Main District Canal becomes the boundary of the area of interest. The Main District Canal, then the South San Joaquin Main Canal is followed until the intersection with Woodward Reservoir. At this point, the

boundary follows the drainage divide between Woodward Reservoir and Littlejohns Creek, then follows the South San Joaquin Main Canal, and the North Main Canal. Just past the intersection of North Main Canal and Littlejohns Creek, the boundary follows the divide between the San Joaquin Main Canal and Littlejohns Creek until it reaches the Stanislaus County line.

The east boundary of the area of interest follows the eastern edge of the Stanislaus and Merced County lines. Where the Merced County line meets the Madera County line, the boundary follows the CalWater boundary to the San Joaquin River at Friant Dam.

The southern boundary follows the San Joaquin River to the Mendota Pool. Here the boundary follows the southern edge of Calwater RBUASPW areas 654120000 (Los Banos Hydrologic Area), 654241052, 654241053, and 654241054. Where 654241054 meets San Benito County, the border follows the county line north.

The western boundary is formed by the eastern county line of San Benito County and the western edges of Merced and Stanislaus counties. Though some water in the area of interest does originate in San Benito County, it was excluded because the water from this region does not significantly impact the affected water bodies and to reduce the number of jurisdictions unnecessarily affected by the TMDL. Western Merced and Stanislaus counties were chosen as the boundaries because the county lines follow the crest of the Coast Range and therefore the edge of the watersheds that drain the eastern slope of the Coast Range.

From the crest of the Coast Range north of the San Joaquin-Stanislaus county line, the border is formed by the drainage surrounding Hospital and Lone Tree Creeks. Where the drainage meets the boundary of Calwater 654110000 (Patterson Hydrologic Area), it continues along the northern edge of Calwater 656410000 until it reaches the gas line running northeast across the Vernalis Gas Fields which it follows coincident with the angle of Airport Road to the San Joaquin River.

Appendix B

Table 1: Calwater Watersheds within the Area of Interest

Partially Contained within AOI		Entirely Contained Within AOI	
653510000	654241036	653530000	654220020
653540011	654241037	653560000	654210040
653410010	654241053	653550000	654210042
653520000	653590000	654210017	654220021
653620010	653800071	654210010	654220034
653410010		654210012	654220033
653620012		654210016	654220031
653620021		654210014	654220022
653620030		654210015	654220032
653620011		654210011	654220012
653620031		654210013	654220030
653620000		654210024	654220011
654110000		654210020	654220013
653710011		654210023	654220040
653710010		654210022	654220043
653710012		653580000	654220041
653800032		654210060	654220044
654120000		654210031	654220042
653800062		654210021	654220045
654241013		654210030	654510000
654241012		654210050	654520000
654241011		654210041	654530000

10. Sub area-Boundaries: The area of interest is divided into seven sub-areas, each with a unique hydrologic drainage. The purpose of these sub-areas is to facilitate the determination of loading from various parts of the watershed. The sub-area boundaries were derived, in part, on previous watershed delineations performed by Charlie Kratzer with the USGS (USGS, 1998)

    A. East Valley Floor: This is the drainage area is primarily located between each of the major river drainages. It actually consists of three inter-basin areas. The northern most of the three areas is the area between the Stanislaus and Tuolumne River drainages, the middle area is between the Tuolumne and Merced River drainages, and the southern most area is between the Merced River and Bear Creek drainage basins. This area is made up of all land east of the San Joaquin River that is not included in any of the above mentioned watersheds, south of the Stanislaus River, west Tuolumne and Mariposa counties, and north of the Bear Creek drainage area.

    The north region boundary begins at the Vernalis sampling site and follows the Stanislaus River upstream to the discharge point of Lateral No. 6. From here, it follows Lateral No. 6 to Modesto Main Canal, Stowell Lateral, Albers Lateral, and to Claribel Lateral. The boundary follows Claribel Lateral south to Dry Creek and then back to Modesto Main Canal which it then follows to Lateral No. 3.

    It then continues west along Lateral No. 3 to Lateral No. 4, around the McHenry Stormdrain basin to the western boundary of the Ninth Street Stormdrain basin and

follows the northern boundary of West Side Stormdrain basin. At this point, it follows Lateral No. 5 from its juncture with Lateral No. 4 to Michigan Ave, which it then follows to west to Paradise Rd. and then south to Shiloh Rd. where it crosses the Tuolumne River.

The central section of the East Valley Floor sub-area begins at Shiloh Rd., where it crosses the Tuolumne River and follows Shiloh Rd. south to Grayson Rd. and over to Lower Lateral No. 2. It follows Lower Lateral No. 2 east to Lateral No. 1, Ceres Main Canal, and Turlock Main Canal. It continues along Turlock Main Canal, through Turlock Lake, to the Tuolumne until it reaches the Stanislaus/Tuolumne County line. Here it follows the county line south to the topographic divide between the Tuolumne and Merced Rivers and the divide between Mustang Creek and Dry Creek until it reaches Highline Canal, which it follows to the divide between Turlock Main Canal and Cross Ditch to Harding Rd. The boundary continues south along Lateral No. 6 to Lateral No. 7 and on to the Stevinson Lower Lateral until it reaches the Merced River where River Rd. crosses it.

The southern section of the East Valley Floor continues from the River Rd. crossing of the Merced River along the topographic watershed boundary of the Merced River until it meets the ridge defining the northern edge of the Bear Creek watershed. Here, it follows this ridge southwest to the San Joaquin River. The whole western boundary of the East Valley Floor is made up by the San Joaquin River.

B. Grasslands: The Grasslands is the southwest region of the area of interest. It encompasses the drainage areas of Mud Slough and Salt Slough. The south and west boundaries are those of the area of interest, while the northern boundary is based off of the Calwater regions south of the Orestimba Creek watershed and the county line separating Merced and Stanislaus Counties. The eastern boundary is formed by the San Joaquin River and the western boundary of Columbia Canal Company.

C. Merced River: This basin includes drainage to the Merced River, Stevinson Lower Lateral, Highline Canal, Dry Creek, and Livingston Canal. Clockwise from the sampling site, the boundary follows the Stevinson lower lateral, lateral No. 7, and lateral No. 6. At Harding Road, the boundary follows the topographic divide between Turlock Main Canal and Cross ditch, until it hits Highline Canal. It follows Highline Canal north until the Canal intersects with topographic divide between Mustang Creek and Dry Creek, excluding Dry Creek to the north and including Mustang Creek to the south. The boundary continues east along the divide between the Tuolumne and Merced rivers to the Tuolumne County line. The boundary then follows the county line south to the topographic divide between the Merced River and the San Joaquin, Chowchilla and Bear creeks.

Appendix B

D. Northwest Side: This area represents the west side of the San Joaquin Valley that drains to the San Joaquin River downstream of Mud Slough and upstream of the Vernalis sampling site. The sub-area includes the entire drainage area of Orestimba, Del Puerto, and Hospital Creeks. The boundary follows a straight line from the sampling site along Airport Road coincident with a pipe running across the Vernalis Gas Fields. This line is followed until it reaches Calwater 654110000 (Patterson Hydrologic Area). It begins to follow the drainage of Lone Tree Creek as drawn from 24k USGS topographic quadrangles where Calwater 654210000 (Del Puerto Creek Hydrologic Area) intersects it. From here, it follows the eastern and northern boundaries Calwater 654210000 boundary to the northern watershed boundary of Lone Tree Creek to the crest of the Coast Range, which it then follows down to the Orestimba Creek watershed.

   From the Coast Range, it follows the southern boundary of the Orestimba Creek drainage area and then the area drained by Orestimba Creek during irrigation season as determined by surface water specialist Charlie Kratzer with USGS. The San Joaquin River forms the eastern boundary of the Northwest Side sub-area.

E. San Joaquin River above Salt Slough: This sub-area comprises the area that drains to the San Joaquin River upstream of the Lander Ave. (Hwy. 165) sampling site. From the site and going clockwise, the border follows the watershed boundary between canals and creeks as discerned from RF3 by regional board staff until it meets the watershed boundary between Merced River and Bear Creek. It then follows this topographic boundary to the Mariposa County line. From here the Mariposa County line forms the boundary to the Madera County line. At this point, the boundary follows the eastern edge of the Calwater 654530000 (Berenda Creek Hydrologic Area) boundary to the San Joaquin River at Friant Dam. Here the boundary follows the San Joaquin River to where the Columbia Canal Company boundary intersects the river. At this location, the border follows the Columbia Canal Company boundary north and then west back to the San Joaquin River. Here, it follows the San Joaquin River north back to the sampling site.

F. Stanislaus River: The boundary from Vernalis follows the Stanislaus River to the Caswell Park. It includes the entirety of the park as well as some surrounding land that is also thought to drain into the Stanislaus River. From Caswell Park, the boundary follows a ridgeline north of which water is known to flow downstream of Vernalis, but south of which flows into the Stanislaus River. This ridge is followed to the fork of the Main District Canal east of Ripon. At this location, the Main District Canal becomes the boundary. The Main District Canal, then the South San Joaquin Main Canal is followed until the intersection with Woodward Reservoir. At this point, the boundary follows the drainage divide between Woodward Reservoir and Littlejohns Creek, then follows South San Joaquin Main Canal, and North Main Canal. Just past the intersection of North Main Canal and Littlejohns Creek, the

boundary follows the divide between San Joaquin Main Canal and Littlejohns Creek until it reaches the Stanislaus County line.

At the county line, the boundary turns south until it meets the Oakdale South Main Drain. The boundary then follows Oakdale South Main Drain, Claribel Lateral, Albers Lateral, Stowell Lateral, Modesto Main Canal, then Lateral No. 6 to the east until it intersects with the Stanislaus River. At this point the boundary follows the divide between the area draining to the Stanislaus River and the area draining to the San Joaquin River.

G. Tuolumne River: This basin includes drainage to the Tuolumne River at Modesto. Clockwise from the sampling site, the boundary follows Shiloh Road north to Paradise Road east to Michigan Avenue. It then follows Lateral No. 5 the juncture with Lateral No. 4. At this point, the boundary follows the northern boundary of West Side Stormdrain basin and the western boundary of the Ninth Street Stormdrain basin, then goes around McHenry Stormdrain basin to Lateral No. 4. It continues east along lateral no. 4, lateral no. 3, then Modesto Main Canal until it intersects with Dry Creek. At this point, the boundary follows Claribel Lateral, Riverbank Lateral, and then follows the drainage divide between Kearney Lateral and Oakdale South Main Canal. The boundary crosses Oakdale Main Canal just prior to the intersection with Cashman Creek, follows the divide between Oakdale South Main Canal and Tuolumne River tributatires, then again along Oakdale South Main Canal around the main stem of Wildcat Creek. When the boundary intersects Highway 108 it follows the divide between Stanislaus River (and tributaries) and the Tuolumne River until it reaches the Stanislaus-Tuolumne County line. It follows the county line south to the drainage boundary between the Tuolumne and Merced Rivers. The boundary continue southwest along the divide between Tuolumne River and Merced River, Turlock Main Canal, Turlock Lake. One the west side of Turlock Lake the boundary follows Turlock Main Canal, Ceres Main Canal, Lateral no. 1, and Lateral No. 2. The boundary goes from Lateral No. 2 to Shiloh Road, and along Shiloh Road (roughly) until it reaches the sampling site.

11. Monitoring Stations: Lat/Long coordinate data for each of the monitoring station within the LJSR was obtained from field personnel using hand held GPS receivers (WGS84). Each coordinate pair was converted to decimal degrees within an Excel spreadsheet. The spreadsheet was then converted to an event theme in Arcview. The resultant point theme was projected from decimal degrees to Teale Albers.

Appendix B

Metadata

Reach File 3-alpha

Identification_Information:
  Citation:
    Citation_Information:
      Originator: U.S. Environmental Protection Agency/Office of Water/OST Basins
      Publication_Date: 19980309
      Title:
        USEPA/OW River Reach File 3 (RF3) Alpha for CONUS, Hawaii, Puerto Rico, and
        the U.S. Virgin Islands
      Edition: 3alpha
      Publication_Information:
        Publication_Place: Washington DC
        Publisher: US EPA/Office of Water
      Online_Linkage:
        For BASINS model and hydrographic data http://www.epa.gov/OST/BASINS
        For documentation and reference to EPA's River Reach data files
        http://www.epa.gov/owowwtr1/monitoring/rf/rfindex.html

  Description:

    Abstract:
      The U.S. Environmental Protection Agency's (EPA) Reach Files are a series of hydrographic databases of the surface waters of the continental United States and Hawaii. A key characteristic of the Reach files are their attributes that define the connected stream network. These attributes provide connectivity regardless of the presence or absence of topologic continuity in the digital linework. Flow direction is inherent in the connectivity attributes. This attribute-level connectivity enables the Reach Files to provide hydrologic ordering of stream locations using reach codes (what is upstream and downstream of a given point in the stream network) as well as network navigation proceeding in either the upstream or downstream direction.

      RF3-Alpha data is un-validated and given the nature of the shortcomings that have been identified in the RF3-Alpha data and the re-design work that is being incorporated into RF3 validation to support GIS applications, it is recommended that a conservative approach be taken when processing and applying these data. The final, validated RF3 ("The National Hydrography Dataset") will provide a much improved data product. In the mean time, access to the provisional Alpha data, accompanying documentation, and technical support is provided through the Office of Water's (OW) STORET User Assistance Group. STORET, EPA's national water

quality data system, is currently undergoing a major re-design to address evolving user requirements and technology advancements including GIS. Both STORET and RF3 will play integral roles in EPA's future water quality data collection, analysis, and reporting activities.

For further assistance on RF3 Alpha, please contact STORET User Assistance at 800-424-9067.

Purpose:

The structure and content of the Reach File databases were created expressly to establish hydrologic ordering, to perform hydrologic navigation for modeling applications, and to provide a unique identifier for each surface water feature, i.e., reach codes.

Supplemental_Information:

Procedures_Used

RF3a files were initially produced as ArcInfo export files (.e00 file) on a U.S. EPA mainframe computer in the STORET environment. RF3a vector files were requested by hydrological unit code (HUC) within an entire state. Upon completion of mainframe processing, the RF3a files were downloaded using file transfer protocol (FTP). (See Data Quality Information). The initial processing step involved importing the .e00 file into ArcInfo and projecting it to Albers meters. The projected coverage then had a Length_m (meters) item added with its value calculated to hold the length of the arc in meters after projecting to decimal degrees. The coverage was then projected from Albers-meters to decimal degrees-NAD83. A route feature was then built on the rf3rchid item.

The processed ArcInfo export files were compressed and copied to a PC hard disk for storage in one nationwide directory. Upon completion of processing all of the HUCs, a list was generated of all of the processed files. This list was then compared to a list of HUCs created from the United States Geological Survey's (USGS) 1:250,000 Hydrologic units maps of the Conterminous United States to verify the presence of RF3a files for each HUC.

RF3a files were distributed on for inclusion with the BASINS application on CD-ROM as a series of ArcInfo coverages that included the spatial extent of each of the nine U.S. EPA Regions (including the HUCs that crossed Region boundaries). The nine regional coverages therefore overlapped at Regional boundaries. The coverages were distributed in ArcIno coverage format.

Revisions

With the release of Basins version 2, the RF3 Arcinfo coverages were convertted into Arcview shapefiles.

Reviews_Applied_to_Data

Appendix B

Each HUC coverage was reviewed for quality through an ArcInfo AML. The QA/QC AML performed a variety of checks to validate the processing of the RF3a files. Included in these checks were the following steps:

- Does the rf3a.ds3 info table exist?
- Does the rf3a.ds3 info table contain records?
- Is the projection set to GEOGRAPHIC?
- Are units in decimal degrees?
- Is the datum NAD83?
- Does the RF3a route feature exist?
- Does the RF3a.AAT exist?

Once the QA/QC AML was run on each RF3a coverage, each EPA Region was examined in ArcView. The examination consisted of adding each RF3a line coverage as a theme, looking for spikes in the data, and looking for holes in the data.

Related_Spatial_and_Tabular_Data_Sets

References_Cited

McKay, Lucinda, Sue Hanson, Robert Horn, Richard Dulaney, Alan Cahoon, Mark Olsen, and Thomas Dewald, 1994. The U.S. EPA Reach File Version 3.0 Alpha Release (RF3-Alpha) Technical Reference. U.S. Environmental Protection Agency, Washington, DC

Steeves, Peter and Douglas Nebert, 1994. Hydrologic units maps of the Conterminous United States. U.S. Geological Survey, Reston, Virginia

Notes

Time_Period_of_Content:
Time_Period_Information:
Single_Date/Time:
Calendar_Date: 1994
Currentness_Reference: publication date

Status:
Progress: Complete
Maintenance_and_Update_Frequency: None planned

Spatial_Domain:

Appendix B

Bounding_Coordinates:
West_Bounding_Coordinate: -159.0000
East_Bounding_Coordinate: -65.0000
North_Bounding_Coordinate: 50.0000
South_Bounding_Coordinate: 17.0000

Keywords:
Theme:
Theme_Keyword_Thesaurus: None
Theme_Keyword: RF3 alpha Hydrography
Theme_Keyword: River Reach
Place:
Place_Keyword_Thesaurus: Geographic Names Information System
Place_Keyword: Conterminous United States of America
Place_Keyword: Puerto Rico PR
Place_Keyword: U.S. Virgin Islands VI
Place_Keyword: Alabama AL
Place_Keyword: Arizona AZ
Place_Keyword: Arkansas AR
Place_Keyword: California CA
Place_Keyword: Colorado CO
Place_Keyword: Connecticut CT
Place_Keyword: Delaware DE
Place_Keyword: District of Columbia DC
Place_Keyword: Florida FL
Place_Keyword: Georgia GA
Place_Keyword: Hawaii HI
Place_Keyword: Idaho ID
Place_Keyword: Illinois IL
Place_Keyword: Indiana IN
Place_Keyword: Iowa IA
Place_Keyword: Kansas KS
Place_Keyword: Kentucky KY
Place_Keyword: Louisiana LA
Place_Keyword: Maine ME
Place_Keyword: Maryland MD
Place_Keyword: Massachusetts MA
Place_Keyword: Michigan MI
Place_Keyword: Minnesota MN
Place_Keyword: Mississippi MS
Place_Keyword: Missouri MO
Place_Keyword: Montana MT

Appendix B

Place_Keyword: Nebraska NE
Place_Keyword: Nevada NV
Place_Keyword: New Hampshire NH
Place_Keyword: New Jersey NJ
Place_Keyword: New Mexico NM
Place_Keyword: New York NY
Place_Keyword: North Carolina NC
Place_Keyword: North Dakota ND
Place_Keyword: Ohio OH
Place_Keyword: Oklahoma OK
Place_Keyword: Oregon OR
Place_Keyword: Pennsylvania PA
Place_Keyword: Rhode Island RI
Place_Keyword: South Carolina SC
Place_Keyword: South Dakota SD
Place_Keyword: Tennessee TN
Place_Keyword: Texas TX
Place_Keyword: Utah UT
Place_Keyword: Vermont VT
Place_Keyword: Virginia VA
Place_Keyword: Washington WA
Place_Keyword: West Virginia WV
Place_Keyword: Wisconsin WI
Place_Keyword: Wyoming WY

Access_Constraints: none

Use_Constraints: none

Data_Set_Credit:

McKay, Lucinda; Sue Hanson; Robert Horn; Richard Dulaney; Alan Cahoon; Mark Olsen; and Thomas Dewald, 1994. The U.S. EPA Reach File Version 3.0 Alpha Release (RF3-Alpha) Technical Reference. U.S. Environmental Protection Agency, Washington, DC

Security_Information:
Security_Classification_System: None
Security_Classification: UNCLASSIFIED
Security_Handling_Description: None

Appendix B

Native_Data_Set_Environment: ArcView 3.0 shapefiles on Window 95 PC

Data_Quality_Information:

Attribute_Accuracy:
Attribute_Accuracy_Report: See Entity_Attribute_Information

Logical_Consistency_Report: Chain-node topology present.

Completeness_Report: See Supplemental Information

Lineage:

Process_Step:
Process_Description:
Example of the GIS process for an RF3A coverage.

IMPORT COVER ../RF3A RF3A
PROJECTDEFINE COVER RF3A
BUILD RF3A ARC
PROJECT COVER RF3A RF3ADD
BUILD RF3ADD ARC
BUILD RF3ADD NODE
ARCROUTE RF3ADD RF3RCH RF3RCHID

Process_Date: 19971218

Spatial_Reference_Information:
Horizontal_Coordinate_System_Definition:
Geographic:
Latitude_Resolution: 0.0001
Longitude_Resolution: 0.0001

Appendix B

```
      Geographic_Coordinate_Units: Decimal Degrees
    Geodetic_Model:
      Horizontal_Datum_Name: North American Datum of 1983
      Ellipsoid_Name: Geodetic Reference System 80
      Semi-major_Axis: 6,378,137
      Denominator_of_Flattening_Ratio: 298.257

Entity_and_Attribute_Information:

  Detailed_Description:
    Entity_Type:
      Entity_Type_Label: RF3A.SHP
      Entity_Type_Definition: RF3a shapefiles
      Entity_Type_Definition_Source: USEPA/OW
    Attribute:
      Attribute_Label: -
      Attribute_Definition: RF3a arc attribute table
      Attribute_Definition_Source: U.S. EPA RF3a files
      Attribute_Domain_Values:
        Enumerated_Domain:
          Enumerated_Domain_Value: -
          Enumerated_Domain_Value_Definition:
          Enumerated_Domain_Value_Definition_Source:
    Attribute:
      Attribute_Label: SHAPE
      Attribute_Definition: Internal number
      Attribute_Definition_Source: Computed
      Attribute_Domain_Values:
        Enumerated_Domain:
          Enumerated_Domain_Value: Sequential unique positive integer
          Enumerated_Domain_Value_Definition:
          Enumerated_Domain_Value_Definition_Source:



    Attribute:
      Attribute_Label: FNODE
      Attribute_Definition: From node
      Attribute_Definition_Source: Computed
      Attribute_Domain_Values:
        Enumerated_Domain:
          Enumerated_Domain_Value: Real positive numbers
          Enumerated_Domain_Value_Definition: 8 11 F 0
```

```
      Enumerated_Domain_Value_Definition_Source: USEPA/OW
  Attribute:
    Attribute_Label: TNODE
    Attribute_Definition: To node
    Attribute_Definition_Source: Computed
    Attribute_Domain_Values:
      Enumerated_Domain:
        Enumerated_Domain_Value: Real positive numbers
        Enumerated_Domain_Value_Definition: 8 11 F 0
        Enumerated_Domain_Value_Definition_Source: USEPA/OW
  Attribute:
    Attribute_Label: LPOLY
    Attribute_Definition: Internal number of the polygon on the left
    Attribute_Definition_Source: Computed
    Attribute_Domain_Values:
      Enumerated_Domain:
        Enumerated_Domain_Value: Sequential unique positive integer
        Enumerated_Domain_Value_Definition: 8 11 F 0
        Enumerated_Domain_Value_Definition_Source: USEPA/OW
  Attribute:
    Attribute_Label: RPOLY
    Attribute_Definition: Internal number of the polygon on the right
    Attribute_Definition_Source: Computed
    Attribute_Domain_Values:
      Enumerated_Domain:
        Enumerated_Domain_Value: Sequential unique positive integer
        Enumerated_Domain_Value_Definition: 8 11 F 0
        Enumerated_Domain_Value_Definition_Source: USEPA/OW
  Attribute:
    Attribute_Label: LENGTH
    Attribute_Definition: Length of arc in coverage units
    Attribute_Definition_Source: Computed
    Attribute_Domain_Values:
      Enumerated_Domain:
        Enumerated_Domain_Value: Positive real numbers
        Enumerated_Domain_Value_Definition: 4 5 B
        Enumerated_Domain_Value_Definition_Source: USEPA/OW
  Attribute:
    Attribute_Label: Annnnnnn
    Attribute_Definition: Internal feature number
    Attribute_Definition_Source: Computed
    Attribute_Domain_Values:
      Enumerated_Domain:
```

Enumerated_Domain_Value: Unique positive number
Enumerated_Domain_Value_Definition: 8 11 F 0
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: Annnnnnn_I
Attribute_Definition: User assigned feature ID number
Attribute_Definition_Source: User-defined
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Unique positive integer
Enumerated_Domain_Value_Definition: 8 11 F 0
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: CU
Attribute_Definition: Hydrologic Catalog Unit
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: 8 digit positive integers
Enumerated_Domain_Value_Definition: 8 8 F 0
Enumerated_Domain_Value_Definition_Source: USGS
Attribute:
Attribute_Label: SEG
Attribute_Definition: Segment
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Positive real numbers
Enumerated_Domain_Value_Definition: 4 4 B
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: MI
Attribute_Definition: Marker Index - refer to RF3a Technical Documentation
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Integers
Enumerated_Domain_Value_Definition: 5 5 C
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: UP
Attribute_Definition:
Value for the IMPEDANCE command in ARC network

commands such as PATH, ALLOCATE, and TOUR. To restrict the network traversal to upstream only, use IMPEDANCE DOWN UP. To restrict to downstream traversal, use IMPEDANCE UP DOWN.
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Positive real numbers
Enumerated_Domain_Value_Definition: 8 11 F 0
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: DOWN
Attribute_Definition:
Value for the IMPEDANCE command in ARC network commands such as PATH, ALLOCATE, and TOUR. To restrict the network traversal to upstream only, use IMPEDANCE DOWN UP. To restrict to downstream traversal, use IMPEDANCE UP DOWN.
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: positive real numbers
Enumerated_Domain_Value_Definition: 8 11 F 0
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: LENGTH_M
Attribute_Definition: Reach length in meters
Attribute_Definition_Source: Calculated from LENGTH in meters
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Positive real numbers
Enumerated_Domain_Value_Definition: 8 12 F 2
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: RF3RCHID
Attribute_Definition:
Unique river reach identifier concatenated from CU, SEG, and MI
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Numeric
Enumerated_Domain_Value_Definition: 17 17 C
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:

Appendix B

```
    Attribute_Label: CUA
    Attribute_Definition: Cataloging Unit
    Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
    Attribute_Domain_Values:
      Enumerated_Domain:
        Enumerated_Domain_Value: numeric
        Enumerated_Domain_Value_Definition: 8 8 F 0
        Enumerated_Domain_Value_Definition_Source: USEPA/OW
  Attribute:
    Attribute_Label: SEGA
    Attribute_Definition: Segment number
    Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
    Attribute_Domain_Values:
      Enumerated_Domain:
        Enumerated_Domain_Value: numeric
        Enumerated_Domain_Value_Definition: 4 4 B
        Enumerated_Domain_Value_Definition_Source: USEPA/OW
  Attribute:
    Attribute_Label: MIA
    Attribute_Definition: Marker Index
    Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
    Attribute_Domain_Values:
      Enumerated_Domain:
        Enumerated_Domain_Value: Numeric
        Enumerated_Domain_Value_Definition: 5 5 C
        Enumerated_Domain_Value_Definition_Source: USEPA/OW
  Attribute:
    Attribute_Label: UPMI
    Attribute_Definition: Upstream marker index
    Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
    Attribute_Domain_Values:
      Enumerated_Domain:
        Enumerated_Domain_Value: Numeric
        Enumerated_Domain_Value_Definition: 5 5 C
        Enumerated_Domain_Value_Definition_Source: USEPA/OW
  Attribute:
    Attribute_Label: RFLAG
    Attribute_Definition: Reach flag
    Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
    Attribute_Domain_Values:
      Enumerated_Domain:
        Enumerated_Domain_Value: Character (0,1)
        Enumerated_Domain_Value_Definition: 1 1 C
```

Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: OWFLAG
Attribute_Definition: Open water flag
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Character (0,1)
Enumerated_Domain_Value_Definition: 1 1 C
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: TFLAG
Attribute_Definition: Terminal flag
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Character (0,1)
Enumerated_Domain_Value_Definition: 1 1 C
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: SFLAG
Attribute_Definition: Start flag
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Character (0,1)
Enumerated_Domain_Value_Definition: 1 1 C
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: REACHTYPE
Attribute_Definition: Reach type code
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Alphabetical character
Enumerated_Domain_Value_Definition: 1 1 C
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: LEVEL
Attribute_Definition: Stream level
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:

Enumerated_Domain_Value: Numeric
Enumerated_Domain_Value_Definition: 4 2 B
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: JUNC
Attribute_Definition: Level of downstream reach
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Numeric
Enumerated_Domain_Value_Definition: 4 2 B
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: DIVERGENCE
Attribute_Definition: Divergence code
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Numeric
Enumerated_Domain_Value_Definition: 4 1 B
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: USDIR
Attribute_Definition: Upstream direction of main path
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Character
Enumerated_Domain_Value_Definition: 1 1 C
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: TERMID
Attribute_Definition: Terminal stream ID (future use)
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Numeric
Enumerated_Domain_Value_Definition: 4 5 B
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: TRMBLV
Attribute_Definition: Terminal base level (future use)
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)

Appendix B

```
    Attribute_Domain_Values:
     Enumerated_Domain:
       Enumerated_Domain_Value: Numeric
       Enumerated_Domain_Value_Definition: 4 1 B
       Enumerated_Domain_Value_Definition_Source: USEPA/OW
  Attribute:
    Attribute_Label: PNAME
    Attribute_Definition: Primary name
    Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
    Attribute_Domain_Values:
     Enumerated_Domain:
       Enumerated_Domain_Value: Character
       Enumerated_Domain_Value_Definition: 30 30 C
       Enumerated_Domain_Value_Definition_Source: USEPA/OW
  Attribute:
    Attribute_Label: PNMCD
    Attribute_Definition: Primary name code
    Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
    Attribute_Domain_Values:
     Enumerated_Domain:
       Enumerated_Domain_Value: numeric
       Enumerated_Domain_Value_Definition: 11 11 C
       Enumerated_Domain_Value_Definition_Source: USEPA/OW
  Attribute:
    Attribute_Label: CNAME
    Attribute_Definition: Common name
    Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
    Attribute_Domain_Values:
     Enumerated_Domain:
       Enumerated_Domain_Value: Character
       Enumerated_Domain_Value_Definition: 30 30 C
       Enumerated_Domain_Value_Definition_Source: USEPA/OW
  Attribute:
    Attribute_Label: CNMCD
    Attribute_Definition: Common name code
    Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
    Attribute_Domain_Values:
     Enumerated_Domain:
       Enumerated_Domain_Value: Numeric
       Enumerated_Domain_Value_Definition: 11 11 C
       Enumerated_Domain_Value_Definition_Source: USEPA/OW
  Attribute:
    Attribute_Label: OWNAME
```

Appendix B

Attribute_Definition: Open water name
Attribute_Definition_Source: U.S. EPA RF3a files (form STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Character
Enumerated_Domain_Value_Definition: 30 30 C
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: OWNMCD
Attribute_Definition: Open water name code
Attribute_Definition_Source: U.S. EPA RF3a files (From STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Numeric
Enumerated_Domain_Value_Definition: 11 11 C
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: DSCU
Attribute_Definition: Downstream CU
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Numeric
Enumerated_Domain_Value_Definition: 8 8 F 0
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: DSSEG
Attribute_Definition: Downstream SEG
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Numeric
Enumerated_Domain_Value_Definition: 4 4 B
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: DSMI
Attribute_Definition: Downstream MI
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Numeric
Enumerated_Domain_Value_Definition: 5 5 C
Enumerated_Domain_Value_Definition_Source: USEPA/OW

Appendix B

Attribute:
Attribute_Label: CCU
Attribute_Definition: Complement CU
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Numeric
Enumerated_Domain_Value_Definition: 8 8 F
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: CSEG
Attribute_Definition: Complement SEG
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Numeric
Enumerated_Domain_Value_Definition: 4 4 B
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: CMI
Attribute_Definition: Complement MI
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Numeric
Enumerated_Domain_Value_Definition: 5 5 C
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: CDIR
Attribute_Definition: Complement direction
Attribute_Definition_Source: U.S. EPA RF3a files (form STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Character
Enumerated_Domain_Value_Definition: 1 1 C
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: ULCU
Attribute_Definition: Upstream left CU
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Numeric

Enumerated_Domain_Value_Definition: 8 8 F 0
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: ULSEG
Attribute_Definition: Upstream left SEG
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Numeric
Enumerated_Domain_Value_Definition: 4 4 B
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: ULMI
Attribute_Definition: Upstream left MI
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Numeric
Enumerated_Domain_Value_Definition: 5 5 C
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: URCU
Attribute_Definition: Upstream right CU
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Numeric
Enumerated_Domain_Value_Definition: 8 8 F
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: URSEG
Attribute_Definition: Upstream right SEG
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Numeric
Enumerated_Domain_Value_Definition: 4 4 B
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: URMI
Attribute_Definition: Upstream right MI
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:

```
      Enumerated_Domain:
        Enumerated_Domain_Value: Numeric
        Enumerated_Domain_Value_Definition: 5 5 C
        Enumerated_Domain_Value_Definition_Source: USEPA/OW
  Attribute:
    Attribute_Label: SEGL
    Attribute_Definition: Reach length (Miles)
    Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
    Attribute_Domain_Values:
      Enumerated_Domain:
        Enumerated_Domain_Value: Numeric (6.2)
        Enumerated_Domain_Value_Definition: 4 6 F 2
        Enumerated_Domain_Value_Definition_Source: USEPA/OW
  Attribute:
    Attribute_Label: RFORGFLAG
    Attribute_Definition: RF origin flag
    Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
    Attribute_Domain_Values:
      Enumerated_Domain:
        Enumerated_Domain_Value: Character (1,2,3)
        Enumerated_Domain_Value_Definition: 4 1 B
        Enumerated_Domain_Value_Definition_Source: USEPA/OW
  Attribute:
    Attribute_Label: ALTPNMCD
    Attribute_Definition: Alternate primary name code (future use)
    Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
    Attribute_Domain_Values:
      Enumerated_Domain:
        Enumerated_Domain_Value: Numeric
        Enumerated_Domain_Value_Definition: 8 8 F 0
        Enumerated_Domain_Value_Definition_Source: USEPA/OW
  Attribute:
    Attribute_Label: ALTOWNMC
    Attribute_Definition: Alternate OW name code (future use)
    Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
    Attribute_Domain_Values:
      Enumerated_Domain:
        Enumerated_Domain_Value: Numeric
        Enumerated_Domain_Value_Definition: 8 8 F 0
        Enumerated_Domain_Value_Definition_Source: USEPA/OW
  Attribute:
    Attribute_Label: DLAT
    Attribute_Definition: Downstream latitude
```

Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Numeric (8.4)
Enumerated_Domain_Value_Definition: 8 8 F 4
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: DLONG
Attribute_Definition: Downstream longitude
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Numeric (8.4)
Enumerated_Domain_Value_Definition: 8 8 F 4
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: ULAT
Attribute_Definition: Upstream latitude
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Numeric (8.4)
Enumerated_Domain_Value_Definition: 8 8 F 4
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: ULONG
Attribute_Definition: Upstream longitude
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Numeric (8.4)
Enumerated_Domain_Value_Definition: 8 8 F 4
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: MINLAT
Attribute_Definition: Minimum latitude
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Numeric (8.4)
Enumerated_Domain_Value_Definition: 8 8 F 4
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:

Appendix B

```
    Attribute_Label: MINLONG
    Attribute_Definition: Minimum longitude
    Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
    Attribute_Domain_Values:
     Enumerated_Domain:
      Enumerated_Domain_Value: Numeric (8.4)
      Enumerated_Domain_Value_Definition: 8 8 F 4
      Enumerated_Domain_Value_Definition_Source: USEPA/OW
  Attribute:
    Attribute_Label: MAXLAT
    Attribute_Definition: Maximum latitude
    Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
    Attribute_Domain_Values:
     Enumerated_Domain:
      Enumerated_Domain_Value: Numeric (8.4)
      Enumerated_Domain_Value_Definition: 8 8 F 4
      Enumerated_Domain_Value_Definition_Source: USEPA/OW
  Attribute:
    Attribute_Label: MAXLONG
    Attribute_Definition: Maximum longitude
    Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
    Attribute_Domain_Values:
     Enumerated_Domain:
      Enumerated_Domain_Value: Numeric (8.4)
      Enumerated_Domain_Value_Definition: 8 8 F 4
      Enumerated_Domain_Value_Definition_Source: USEPA/OW
  Attribute:
    Attribute_Label: NDLGREC
    Attribute_Definition: Number of DLG records
    Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
    Attribute_Domain_Values:
     Enumerated_Domain:
      Enumerated_Domain_Value: Numeric
      Enumerated_Domain_Value_Definition: 4 4 B
      Enumerated_Domain_Value_Definition_Source: USEPA/OW
  Attribute:
    Attribute_Label: LN1AT2
    Attribute_Definition: DLG line attribute 1
    Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
    Attribute_Domain_Values:
     Enumerated_Domain:
      Enumerated_Domain_Value: Numeric
      Enumerated_Domain_Value_Definition: 4 4 B
```

```
      Enumerated_Domain_Value_Definition_Source: USEPA/OW
  Attribute:
   Attribute_Label: LN2AT2
   Attribute_Definition: DLG line attribute 2
   Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
   Attribute_Domain_Values:
    Enumerated_Domain:
     Enumerated_Domain_Value: Numeric
     Enumerated_Domain_Value_Definition: 4 4 B
     Enumerated_Domain_Value_Definition_Source: USEPA/OW
  Attribute:
   Attribute_Label: AR1AT2
   Attribute_Definition: DLG area attribute
   Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
   Attribute_Domain_Values:
    Enumerated_Domain:
     Enumerated_Domain_Value: Numeric
     Enumerated_Domain_Value_Definition: 4 4 B
     Enumerated_Domain_Value_Definition_Source: USEPA/OW
  Attribute:
   Attribute_Label: AR1AT4
   Attribute_Definition: DLG area attribute
   Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
   Attribute_Domain_Values:
    Enumerated_Domain:
     Enumerated_Domain_Value: Numeric
     Enumerated_Domain_Value_Definition: 4 4 B
     Enumerated_Domain_Value_Definition_Source: USEPA/OW
  Attribute:
   Attribute_Label: AR2AT2
   Attribute_Definition: DLG area attribute
   Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
   Attribute_Domain_Values:
    Enumerated_Domain:
     Enumerated_Domain_Value: Numeric
     Enumerated_Domain_Value_Definition: 4 4 B
     Enumerated_Domain_Value_Definition_Source: USEPA/OW
  Attribute:
   Attribute_Label: AR2AT4
   Attribute_Definition: DLG area attribute
   Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
   Attribute_Domain_Values:
    Enumerated_Domain:
```

Enumerated_Domain_Value: Numeric
Enumerated_Domain_Value_Definition: 4 4 B
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: UPDATE1
Attribute_Definition: Update date #1
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Character (mmddyy)
Enumerated_Domain_Value_Definition: 6 6 C
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: UPDTCD1
Attribute_Definition: Update type Code #1
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Character
Enumerated_Domain_Value_Definition: 8 8 C
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: UPDTSRC1
Attribute_Definition: Update Source #1
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Character
Enumerated_Domain_Value_Definition: 8 8 C
Enumerated_Domain_Value_Definition_Source: USEPA/OW
Attribute:
Attribute_Label: UPDATE2
Attribute_Definition: Update date #2 [future use]
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Character (mmddyy)
Enumerated_Domain_Value_Definition: 6 6 C
Enumerated_Domain_Value_Definition_Source: USEPA/OW

Attribute:
Attribute_Label: UPDTCD2
Attribute_Definition: Update type code #2 [future use]

Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Character
Enumerated_Domain_Value_Definition: 8 8 C
Enumerated_Domain_Value_Definition_Source: USEPA/OW

Attribute:
Attribute_Label: UPDTSRC2
Attribute_Definition: Update Source #2 [future use]
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Character
Enumerated_Domain_Value_Definition: 8 8 C
Enumerated_Domain_Value_Definition_Source: USEPA/OW

Attribute:
Attribute_Label: UPDATE3
Attribute_Definition: Update Date #3 [future use]
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Character (mmddyy)
Enumerated_Domain_Value_Definition: 6 6 C
Enumerated_Domain_Value_Definition_Source: USEPA/OW

Attribute:
Attribute_Label: UPDTCD3
Attribute_Definition: Update Type Code #3 [future use]
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Character
Enumerated_Domain_Value_Definition: 8 8 C
Enumerated_Domain_Value_Definition_Source: USEPA/OW

Attribute:
Attribute_Label: UPDTSRC3
Attribute_Definition: Update Source #3 [future use]
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:

```
      Enumerated_Domain_Value: Character
      Enumerated_Domain_Value_Definition: 8 8 C
      Enumerated_Domain_Value_Definition_Source: USEPA/OW

  Attribute:
   Attribute_Label: DIVCU
   Attribute_Definition: Divergent CU
   Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
   Attribute_Domain_Values:
    Enumerated_Domain:
     Enumerated_Domain_Value: Numeric
     Enumerated_Domain_Value_Definition: 8 8 F 0
     Enumerated_Domain_Value_Definition_Source: USEPA/OW

  Attribute:
   Attribute_Label: DIVSEG
   Attribute_Definition: Divergent SEG
   Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
   Attribute_Domain_Values:
    Enumerated_Domain:
     Enumerated_Domain_Value: Numeric
     Enumerated_Domain_Value_Definition: 4 4 B
     Enumerated_Domain_Value_Definition_Source: USEPA/OW

  Attribute:
   Attribute_Label: DIVMI
   Attribute_Definition: Divergent MI
   Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
   Attribute_Domain_Values:
    Enumerated_Domain:
     Enumerated_Domain_Value: Numeric
     Enumerated_Domain_Value_Definition: 5 5 C
     Enumerated_Domain_Value_Definition_Source: USEPA/OW

  Attribute:
   Attribute_Label: DLGID
   Attribute_Definition: DLG number (special use)
   Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
   Attribute_Domain_Values:
    Enumerated_Domain:
     Enumerated_Domain_Value: Numeric
     Enumerated_Domain_Value_Definition: 4 6 B
     Enumerated_Domain_Value_Definition_Source: USEPA/OW
```

Appendix B

Attribute:
Attribute_Label: FILLER
Attribute_Definition: Filler [future use]
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Character
Enumerated_Domain_Value_Definition: 7 7 C
Enumerated_Domain_Value_Definition_Source: USEPA/OW

Attribute:
Attribute_Label: RF3RCHID
Attribute_Definition:
Unique river reach identifier concatenated from
CU, SEG, and MI
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Character
Enumerated_Domain_Value_Definition: 17 17 C
Enumerated_Domain_Value_Definition_Source: USEPA/OW

Attribute:
Attribute_Label: DSRF3RCHID
Attribute_Definition: Unique downstream reach identifier
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Character
Enumerated_Domain_Value_Definition: 17 17 C
Enumerated_Domain_Value_Definition_Source: USEPA/OW

Attribute:
Attribute_Label: CURF3RCHID
Attribute_Definition: Unique complement reach identifier
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Character
Enumerated_Domain_Value_Definition: 17 17 C
Enumerated_Domain_Value_Definition_Source: USEPA/OW

Appendix B

Attribute:
Attribute_Label: ULRF3RCHID
Attribute_Definition: Unique upstream left reach identifier
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Character
Enumerated_Domain_Value_Definition: 17 17 C
Enumerated_Domain_Value_Definition_Source: USEPA/OW

Attribute:
Attribute_Label: URRF3RCHID
Attribute_Definition: Unique upstream right reach identifier
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Character
Enumerated_Domain_Value_Definition: 17 17 C
Enumerated_Domain_Value_Definition_Source: USEPA/OW

Attribute:
Attribute_Label: DIVRF3RCHID
Attribute_Definition: Unique divergent reach identifier
Attribute_Definition_Source: U.S. EPA RF3a files (from STORET)
Attribute_Domain_Values:
Enumerated_Domain:
Enumerated_Domain_Value: Character
Enumerated_Domain_Value_Definition: 17 17 C
Enumerated_Domain_Value_Definition_Source: USEPA/OW

Distribution_Information:

Distributor:
Contact_Information:
Contact_Organization_Primary:
Contact_Organization: USEPA Office of Water/OST/SASD Basins
Contact_Address:
Address_Type: mailing address
Address: 401 M Street, SW Mail Stop 4305
City: Washington
State_or_Province: District of Columbia
Postal_Code: 20460
Contact_Voice_Telephone: (202) 260-7301

Contact_Facsimile_Telephone: (202) 260-9830
Hours_of_Service: 9-3 EST
Distribution_Liability:
Although these data have been processed successfully on a computer system under contract to the U.S. Environmental Protection Agency (USEPA), no warranty expressed or implied is made by the USEPA regarding the utility of the data on any other system, nor shall the act of distribution constitute any such warranty. The USEPA will warrant the delivery of this product in computer-readable format.

Standard_Order_Process:
Digital_Form:
Digital_Transfer_Information:
Format_Name: ESRI's ArcView Shapefile format
Digital_Transfer_Option:
Online_Option:
Computer_Contact_Information:
Network_Address:
Network_Resource_Name: (URL): http://www.epa.gov/OST/BASINS/
Digital_Transfer_Option:
Offline_Option:
Offline_Media: CD-ROM
Recording_Format: ISO 9660
Fees: None
Ordering_Instructions:
When requesting data by phone or mail, please inquire about spatial data sets that work with Better Assessment Science Integrating Point and Nonpoint Sources (BASINS). The BASINS web page has instructions for downloading datasets. It also has a link to The National Center for Environmental Publications and Information (NCEPI), from which BASINS CD-ROMs may be ordered. Each CD-ROM contains the BASINS v2.0 application and these data sets along with others covering the spatial extent of an EPA Region.

Metadata_Reference_Information:

Metadata_Date: 19980722
Metadata_Contact:
Contact_Information:
Contact_Organization_Primary:
Contact_Organization: USEPA Office of Water/OST/SASD Basins
Contact_Address:
Address_Type: mailing address
Address: 401 M Street, SW Mail Stop 4305
City: Washington
State_or_Province: District of Columbia

Appendix B

Postal_Code: 20460
Contact_Voice_Telephone: (202) 260-7301
Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: 19940608

METADATA FOR THE 1995 MERCED COUNTY LAND USE SURVEY DATA

Originator:

California Department of Water Resources

Abstract:

The 1995 Merced County land use survey data set was developed by DWR through it's Division of Planning and Local Assistance. The data was gathered using aerial photography and extensive field visits, the land use boundaries and attributes were digitized, and the resultant data went through standard quality control procedures before finalizing. The land uses that were gathered were detailed agricultural land uses, and lesser detailed urban and native vegetation land uses. The data was gathered and digitized by staff of DWR's San Joaquin District and the quality control procedures were performed jointly by staff at DWR's DPLA headquarters from San Joaquin District.

The finalized data include DWG files (land use vector data) and shape files (land use vector data).

Purpose:

This data was developed to aid in DWR's efforts to continually monitor land use for the main purpose of determining the amount of and changes in the use of water.

DWR Contacts:

David Scruggs
San Joaquin District
3374 East Shields Avenue
Fresno, CA 93726-6990
559-230-3322
dscruggs@water.ca.gov

Tom Hawkins
DPLA Headquarters
1416 9th Street
Sacramento, CA 95814

Appendix B

916-653-5573
hawkins@water.ca.gov

Data Development:

1. The aerial photography used for this survey was taken in late June of 1995. The photographs (natural color slides taken from an altitude of about 5,500 feet above ground), were visually interpreted and land use boundaries were drawn on USGS paper 1:24,000 quadrangles.

2. The quad maps were taken to the field as field sheets, and virtually all the areas were visited to positively identify the land use. The site visits occurred in July through September 1995. Land use codes were printed within each area on the field sheets.

3. Using AUTOCAD, the land use boundaries and attributes were digitized (using a standardized digitizing process) from the field sheets on a digitizing tablet.

4. After quality control/assurance procedures were completed on each file (DWG), the data was finalized.

5. The linework and attributes from each DWG quad file were brought into ARCINFO and both quad and surveywide coverages were created, and underwent quality checks. These coverages were converted to shape files using ARCVIEW.

Data Accuracy:

The land use boundaries were hand drawn onto USGS 1:24,000 quads, and digitized on a digitizing tablet using AUTOCAD. For those areas where the lines were drawn onto USGS quads and digitized, the accuracy is less than that of the quads (about 50 foot accuracy).

The land use attribute accuracy is very high, because almost every delineated field was visited in the field. The accuracy is less than 100 percent because some errors must have occurred. There are three possible sources of attribute errors which are:

1) Misidentification of land use in the field (and entering that incorrect attribute on the field sheet);
2) Correct identification of land use, but entering an incorrect attribute on the field sheet, or;
3) Accidentally affixing an incorrect attribute during the digitizing process.

Projection Information:

The data (DWG and shape files) is in a transverse mercator projection, with identical parameters to UTM projections, except the central meridian is -120 degrees (120 degrees west). For

comparison, UTM 10 has a central meridian of 123 degrees west, and UTM 11 has a central meridian of 117 degrees west. This projection allows virtually all of the geographic area of California to be in one 6 degree zone (as opposed to two zones, UTM 10 and 11).

Projection:	Transverse Mercator
Datum:	NAD27
Units:	Meter
Scale Reduction:	0.9996
Central Meridian:	120 degrees west
Origin Latitude:	0.00 N
False Easting:	500,000
False Northing:	0.00

Land Use Attributes:

All land use attributes were coded using the Department's Standard Land Use Legend dated July 1993 (93legend.pdf). The legend explains in detail how each delineated area is attributed in the field, and what the coding system is.

The actual land use code that is printed onto the field maps is different in arrangement than the codes that result from the digitizing process. The file attributes.pdf is a detailed explanation of the coding system used for both coding the field sheets, and the codes that end up in digitized form in the database files associated with the shape files.

Information on the AUTOCAD (DWG) Files:

The land use data is available in AUTOCAD 12 format by quad, with one file per quad. The file naming convention is 95MEXXXX.DWG, where XXXX is the DWR quadrangle number. For example, file 95ME3832.DWG is the AUTOCAD drawing file for the 1995 Merced County land use survey for quadrangle 3832 (the Atwater quad).

Every quadrangle file has identical layers, nomenclature, and line colors. They are as follows:

Layer	Description	Color
0	AutoCAD's default layer	White
CQN	California DWR quad number	Cyan
GSN	USGS quad number	Cyan
LUB	Land use boundary lines	Yellow
LUC	Land use codes for GRASS	White
LUT	Visible land use text	Green
QB	The quad's boundary	White
QN	Quad name	Cyan

Appendix B

Following is an explanation of the attributes (for each delineated area) in the LUC layer of each quad file:

ACRES:	Number of acres in the delineated area (may or may not be present)
WATERSOURC:	The type of water source used for the delineated area
MULTIUSE:	Type of land uses within the delineated area
CLASS1:	The class for the first land use
SUBCLASS1:	The subclass for the first land use
SPECOND1:	The special condition for the first land use
IRR_TYP1:	Irrigated or non-irrigated, and irrigation system type for the first land use
PCNT1:	The percentage of land associated with the first land use
CLASS2:	The class for the second land use
SUBCLASS2:	The subclass for the second land use
SPECOND2:	The special condition for the second land use
IRR_TYP2:	Irrigated or non-irrigated, and irrigation system type for the second land use
PCNT2:	The percentage of land associated with the second land use
CLASS3:	The class for the third land use
SUBCLASS3:	The subclass for the third land use
SPECOND3:	The special condition for the third land use
IRR_TYP3:	Irrigated or non-irrigated, and irrigation system type for the third land use
PCNT3:	The percentage of land associated with the third land use

Information on the Shape Files:

Shape files were created for each quad, and one for the whole survey area. The naming conventions used for the quad DWG files is used for the quad shape files (for example, 95ME3832.shp, 95ME3832.shx, and 95ME3832.dbf for quad number 3832, the Atwater quad). The name of the shape file for the whole survey area is 95ME.shp (and .dbf and .shx). Following is an explanation of the land use attributes in the DBF files:

BL_X:	This is the X coordinate of the interior point in the delineated area
BL_Y:	This is the Y coordinate of the interior point in the delineated area
ACRES:	Number of acres in the delineated area (may or may not be present)
WATERSOURC:	The type of water source used for the delineated area
MULTIUSE:	Type of land uses within the delineated area
CLASS1:	The class for the first land use
SUBCLASS1:	The subclass for the first land use
SPECOND1:	The special condition for the first land use
IRR_TYP1A:	Irrigated or non-irrigated for the first land use
IRR_TYP1B:	Irrigation system type for the first land use
PCNT1:	The percentage of land associated with the first land use
CLASS2:	The class for the second land use

Appendix B

SUBCLASS2:	The subclass for the second land use
SPECOND2:	The special condition for the second land use
IRR_TYP2A:	Irrigated or non-irrigated for the second land use
IRR_TYP2B:	Irrigation system type for the second land use
PCNT2:	The percentage of land associated with the second land use
CLASS3:	The class for the third land use
SUBCLASS3:	The subclass for the third land use
SPECOND3:	The special condition for the third land use
IRR_TYP3A:	Irrigated or non-irrigated for the third land use
IRR_TYP3B:	Irrigation system type for the third land use
PCNT3:	The percentage of land associated with the third land use
UCF_ATT:	Concatenated attributes from MULTIUSE to PCNT3

Important Points about Using this Data Set:

1. The land use boundaries were hand drawn directly on USGS quad maps and then digitized. They were drawn to depict observable areas of the same land use. They were not drawn to represent legal parcel (ownership) boundaries, or meant to be used as parcel boundaries.

2. This survey was a "snapshot" in time. The indicated land use attributes of each delineated area (polygon) were based upon what the surveyor saw in the field at that time, and, to an extent possible, whatever additional information the aerial photography might provide. For example, the surveyor might have seen a cropped field in the photograph, and the field visit showed a field of corn, so the field was given a corn attribute. In another field, the photograph might have shown a crop that was golden in color (indicating grain prior to harvest), and the field visit showed newly planted corn. This field would be given an attribute showing a double crop, grain followed by corn. The DWR land use attribute structure allows for up to three attributes per delineated area (polygon).

   In the cases where there were crops grown before the survey took place, the surveyor may or may not have been able to detect them from the field or the photographs. For crops planted after the survey date, the surveyor could not account for these crops. Thus, although the data is very accurate for that point in time, it may not be an accurate determination of what was grown in the fields for the whole year. If the area being surveyed does have double or multicropping systems, it is likely that there are more crops grown than could be surveyed with a "snapshot".

3. If the data is to be brought into a GIS for analysis of cropped (or planted) acreage, two things must be understood:

a. The acreage of each field delineated is the gross area of the field. The amount of actual planted and irrigated acreage will always be less than the gross acreage, because of ditches, farm roads, other roads, farmsteads, etc. Thus, a delineated corn field may have a GIS calculated acreage of 40 acres but will have a smaller cropped (or net) acreage, maybe 38 acres.

b. Double and multicropping must be taken into account. A delineated field of 40 acres might have been cropped first with grain, then with corn, and coded as such. To estimate actual cropped acres, the two crops are added together (38 acres of grain and 38 acres of corn) which results in a total of 76 acres of net crop (or planted) acres.

4. Water source and irrigation type information was not collected for this survey.

METADATA FOR THE 1995 MADERA COUNTY LAND USE SURVEY DATA

Originator:

California Department of Water Resources

Abstract:

The 1995 Madera County land use survey data set was developed by DWR through it's Division of Planning and Local Assistance. The data was gathered using aerial photography and extensive field visits, the land use boundaries and attributes were digitized, and the resultant data went through standard quality control procedures before finalizing. The land uses that were gathered were detailed agricultural land uses, and lesser detailed urban and native vegetation land uses. The data was gathered and digitized by staff of DWR's San Joaquin District and the quality control procedures were performed jointly by staff at DWR's DPLA headquarters from San Joaquin District.

The finalized data include DWG files (land use vector data) and shape files (land use vector data).

Purpose:

This data was developed to aid in DWR's efforts to continually monitor land use for the main purpose of determining the amount of and changes in the use of water.

DWR Contacts:

David Scruggs
San Joaquin District

Appendix B

3374 East Shields Avenue
Fresno, CA 93726-6990
559-230-3322
dscruggs@water.ca.gov

Tom Hawkins
DPLA Headquarters
1416 9th Street
Sacramento, CA 95814
916-653-5573
hawkins@water.ca.gov

Data Development:

1. The aerial photography used for this survey was taken in late June of 1995. The photographs (natural color slides taken from an altitude of about 5,500 feet above ground), were visually interpreted and land use boundaries were drawn on USGS paper 1:24,000 quadrangles.

2. The quad maps were taken to the field as field sheets, and virtually all the areas were visited to positively identify the land use. The site visits occurred in July through September 1995. Land use codes were printed within each area on the field sheets.

3. Using AUTOCAD, the land use boundaries and attributes were digitized (using a standardized digitizing process) from the field sheets on a digitizing tablet.

4. After quality control/assurance procedures were completed on each file (DWG), the data was finalized.

5. The linework and attributes from each DWG quad file were brought into ARCINFO and both quad and surveywide coverages were created, and underwent quality checks. These coverages were converted to shape files using ARCVIEW.

Data Accuracy:

The land use boundaries were hand drawn onto USGS 1:24,000 quads, and digitized on a digitizing tablet using AUTOCAD. For those areas where the lines were drawn onto USGS quads and digitized, the accuracy is less than that of the quads (about 50 foot accuracy).

The land use attribute accuracy is very high, because almost every delineated field was visited in the field. The accuracy is less than 100 percent because some errors must have occurred. There are three possible sources of attribute errors which are:

Appendix B

1) Misidentification of land use in the field (and entering that incorrect attribute on the field sheet);
2) Correct identification of land use, but entering an incorrect attribute on the field sheet, or;
3) Accidentally affixing an incorrect attribute during the digitizing process.

Projection Information:

The data (DWG and shape files) is in a transverse mercator projection, with identical parameters to UTM projections, except the central meridian is -120 degrees (120 degrees west). For comparison, UTM 10 has a central meridian of 123 degrees west, and UTM 11 has a central meridian of 117 degrees west. This projection allows virtually all of the geographic area of California to be in one 6 degree zone (as opposed to two zones, UTM 10 and 11).

Projection:	Transverse Mercator
Datum:	NAD27
Units:	Meter
Scale Reduction:	0.9996
Central Meridian:	120 degrees west
Origin Latitude:	0.00 N
False Easting:	500,000
False Northing:	0.00

Land Use Attributes:

All land use attributes were coded using the Department's Standard Land Use Legend dated July 1993 (93legend.pdf). The legend explains in detail how each delineated area is attributed in the field, and what the coding system is.

The actual land use code that is printed onto the field maps is different in arrangement than the codes that result from the digitizing process. The file attributes.pdf is a detailed explanation of the coding system used for both coding the field sheets, and the codes that end up in digitized form in the database files associated with the shape files.

Information on the AUTOCAD (DWG) Files:

The land use data is available in AUTOCAD 12 format by quad, with one file per quad. The file naming convention is 95MAXXXX.DWG, where XXXX is the DWR quadrangle number. For example, file 95MA4035.DWG is the AUTOCAD drawing file for the 1995 Madera County land use survey for quadrangle 4035 (the Berenda quad).

Every quadrangle file has identical layers, nomenclature, and line colors. They are as follows:

Layer	Description	Color

Appendix B

0	AutoCAD's default layer	White
CQN	California DWR quad number	Cyan
GSN	USGS quad number	Cyan
LUB	Land use boundary lines	Yellow
LUC	Land use codes for GRASS	White
LUT	Visible land use text	Green
QB	The quad's boundary	White
QN	Quad name	Cyan

Following is an explanation of the attributes (for each delineated area) in the LUC layer of each quad file:

ACRES:	Number of acres in the delineated area (may or may not be present)
WATERSOURC:	The type of water source used for the delineated area
MULTIUSE:	Type of land uses within the delineated area
CLASS1:	The class for the first land use
SUBCLASS1:	The subclass for the first land use
SPECOND1:	The special condition for the first land use
IRR_TYP1:	Irrigated or non-irrigated, and irrigation system type for the first land use
PCNT1:	The percentage of land associated with the first land use
CLASS2:	The class for the second land use
SUBCLASS2:	The subclass for the second land use
SPECOND2:	The special condition for the second land use
IRR_TYP2:	Irrigated or non-irrigated, and irrigation system type for the second land use
PCNT2:	The percentage of land associated with the second land use
CLASS3:	The class for the third land use
SUBCLASS3:	The subclass for the third land use
SPECOND3:	The special condition for the third land use
IRR_TYP3:	Irrigated or non-irrigated, and irrigation system type for the third land use
PCNT3:	The percentage of land associated with the third land use

Information on the Shape Files:

Shape files were created for each quad, and one for the whole survey area. The naming conventions used for the quad DWG files is used for the quad shape files (for example, 95MA4035.shp, 95MA4035.shx, and 95MA4035.dbf for quad number 4035, the Berenda quad). The name of the shape file for the whole survey area is 95MA.shp (and .dbf and .shx). Following is an explanation of the land use attributes in the DBF files:

BL_X:	This is the X coordinate of the interior point in the delineated area
BL_Y:	This is the Y coordinate of the interior point in the delineated area
ACRES:	Number of acres in the delineated area (may or may not be present)

Appendix B

WATERSOURC:	The type of water source used for the delineated area
MULTIUSE:	Type of land uses within the delineated area
CLASS1:	The class for the first land use
SUBCLASS1:	The subclass for the first land use
SPECOND1:	The special condition for the first land use
IRR_TYP1A:	Irrigated or non-irrigated for the first land use
IRR_TYP1B:	Irrigation system type for the first land use
PCNT1:	The percentage of land associated with the first land use
CLASS2:	The class for the second land use
SUBCLASS2:	The subclass for the second land use
SPECOND2:	The special condition for the second land use
IRR_TYP2A:	Irrigated or non-irrigated for the second land use
IRR_TYP2B:	Irrigation system type for the second land use
PCNT2:	The percentage of land associated with the second land use
CLASS3:	The class for the third land use
SUBCLASS3:	The subclass for the third land use
SPECOND3:	The special condition for the third land use
IRR_TYP3A:	Irrigated or non-irrigated for the third land use
IRR_TYP3B:	Irrigation system type for the third land use
PCNT3:	The percentage of land associated with the third land use
UCF_ATT:	Concatenated attributes from MULTIUSE to PCNT3

Important Points about Using this Data Set:

1. The land use boundaries were hand drawn directly on USGS quad maps and then digitized. They were drawn to depict observable areas of the same land use. They were not drawn to represent legal parcel (ownership) boundaries, or meant to be used as parcel boundaries.

2. This survey was a "snapshot" in time. The indicated land use attributes of each delineated area (polygon) were based upon what the surveyor saw in the field at that time, and, to an extent possible, whatever additional information the aerial photography might provide. For example, the surveyor might have seen a cropped field in the photograph, and the field visit showed a field of corn, so the field was given a corn attribute. In another field, the photograph might have shown a crop that was golden in color (indicating grain prior to harvest), and the field visit showed newly planted corn. This field would be given an attribute showing a double crop, grain followed by corn. The DWR land use attribute structure allows for up to three attributes per delineated area (polygon).

   In the cases where there were crops grown before the survey took place, the surveyor may or may not have been able to detect them from the field or the photographs. For crops planted after the survey date, the surveyor could not account for these crops. Thus,

although the data is very accurate for that point in time, it may not be an accurate determination of what was grown in the fields for the whole year. If the area being surveyed does have double or multicropping systems, it is likely that there are more crops grown than could be surveyed with a "snapshot".

3. If the data is to be brought into a GIS for analysis of cropped (or planted) acreage, two things must be understood:

   a. The acreage of each field delineated is the gross area of the field. The amount of actual planted and irrigated acreage will always be less than the gross acreage, because of ditches, farm roads, other roads, farmsteads, etc. Thus, a delineated corn field may have a GIS calculated acreage of 40 acres but will have a smaller cropped (or net) acreage, maybe 38 acres.

   c. Double and multicropping must be taken into account. A delineated field of 40 acres might have been cropped first with grain, then with corn, and coded as such. To estimate actual cropped acres, the two crops are added together (38 acres of grain and 38 acres of corn) which results in a total of 76 acres of net crop (or planted) acres.

4. Water source and irrigation type information was not collected for this survey.

METADATA FOR THE 1996 SAN JOAQUIN COUNTY LAND USE SURVEY DATA

Originator:

California Department of Water Resources

Abstract:

The 1996 San Joaquin County land use survey data set was developed by DWR through it's Division of Planning and Local Assistance. The data was gathered using aerial photography and extensive field visits, the land use boundaries and attributes were digitized, and the resultant data went through standard quality control procedures before finalizing. The land uses that were gathered were detailed agricultural land uses, and lesser detailed urban and native vegetation land uses. The data was gathered and digitized by staff of DWR's Central District and the quality control procedures were performed jointly by staff at DWR's DPLA headquarters from Central District.

The finalized data include DWG files (land use vector data), shape files (land use vector data), and JPEG files (raster data from aerial imagery).

Purpose:

Appendix B

This data was developed to aid in DWR's efforts to continually monitor land use for the main purpose of determining the amount of and changes in the use of water.

DWR Contacts:

Ed Morris
Central District
3251 "S" Street
Sacramento, CA 95816
916-227-7578
emorris@water.ca.gov

Tom Hawkins
DPLA Headquarters
1416 9th Street
Sacramento, CA 95814
916-653-5573
hawkins@water.ca.gov

Data Development:

1. The aerial photography used for this survey was taken in late June of 1996. The photos (natural color, 9" by 9", flown at 18,000' above ground with a 6" lens) were scanned at 300 DPI and plotted to a size of about 20" x 20".

2. The plotted images were taken to the field as field sheets, and virtually all the areas were visited to positively identify the land use. The site visits occurred in July through September 1996. Land use codes were printed within each area on the field sheets.

2. For those areas where the elevation changes were minimal, the scanned images were brought into an image processing system, the images were ratio-rectified (rubbersheeted) into a projection and mosiaced into USGS 1:24,000 quad sized files (photoquads).

4. Using AUTOCAD (using a standardized digitizing process), the photoquads were used as a backdrop to delineate land use boundaries on-screen. For those areas where corrected imagery was not produced (because of excess elevation changes), land use boundaries were drawn onto USGS 1:24,000 quads, and those quad maps digitized on a digitizing tablet. The land use attributes were entered from the field sheets.

5. After quality control/assurance procedures were completed on each file (DWG), the data was finalized.

6. The linework and attributes from each DWG quad file were brought into ARCINFO and both quad and surveywide coverages were created, and underwent quality checks. These coverages were converted to shape files using ARCVIEW.

Data Accuracy:

Linework for those areas where photoquads were developed:

The land use boundaries were drawn on-screen in AUTOCAD using the photoquads as a backdrop. The resultant digital linework for those areas is at best 100 foot accuracy.

Linework for those areas where photoquads were not developed:

The land use boundaries were hand drawn onto USGS 1:24,000 quads, and digitized on a digitizing tablet using AUTOCAD. For those areas where the lines were drawn onto USGS quads and digitized, the accuracy is less than that of the quads (about 50 foot accuracy).

The land use attribute accuracy is very high, because almost every delineated field was visited in the field. The accuracy is less than 100 percent because some errors must have occurred. There are three possible sources of attribute errors which are:

1) Misidentification of land use in the field (and entering that incorrect attribute on the field sheet);
2) Correct identification of land use, but entering an incorrect attribute on the field sheet, or;
3) Accidentally affixing an incorrect attribute during the digitizing process.

The corrected imagery (photoquads) was developed using between 12 and 15 ground control points established from terrain corrected satellite imagery with a stated accuracy of about 30 feet. The imagery has never been fully evaluated for positional accuracy, however we believe that the images have about 100 foot accuracy (90 percent of the time, the data is within 100 feet of it's true position).

Projection Information:

The data (DWG, shape files, and corrected imagery) is in a transverse mercator projection, with identical parameters to UTM projections, except the central meridian is -120 degrees (120 degrees west). For comparison, UTM 10 has a central meridian of 123 degrees west, and UTM 11 has a central meridian of 117 degrees west. This projection allows virtually all of the geographic area of California to be in one 6 degree zone (as opposed to two zones, UTM 10 and 11).

Projection:	Transverse Mercator
Datum:	NAD27

Appendix B

Units:	Meter
Scale Reduction:	0.9996
Central Meridian:	120 degrees west
Origin Latitude:	0.00 N
False Easting:	500,000
False Northing:	0.00

Land Use Attributes:

All land use attributes were coded using the Department's Standard Land Use Legend dated July 1993 (93legend.pdf). The legend explains in detail how each delineated area is attributed in the field, and what the coding system is.

The actual land use code that is printed onto the field maps is different in arrangement than the codes that result from the digitizing process. The file attributes.pdf is a detailed explanation of the coding system used for both coding the field sheets, and the codes that end up in digitized form in the database files associated with the shape files.

Information on the AUTOCAD (DWG) Files:

The land use data is available in AUTOCAD 12 format by quad, with one file per quad. The file naming convention is 96SJXXXX.DWG, where XXXX is the DWR quadrangle number. For example, file 96SJ3327.DWG is the AUTOCAD drawing file for the 1996 San Joaquin County land use survey for quadrangle 3327 (the Stockton East quad).

Every quadrangle file has identical layers, nomenclature, and line colors. They are as follows:

Layer	Description	Color
0	AutoCAD's default layer	White
CQN	California DWR quad number	Cyan
GSN	USGS quad number	Cyan
LUB	Land use boundary lines	Yellow
LUC	Land use codes for GRASS	White
LUT	Visible land use text	Green
QB	The quad's boundary	White
QN	Quad name	Cyan

Following is an explanation of the attributes (for each delineated area) in the LUC layer of each quad file:

ACRES:	Number of acres in the delineated area (may or may not be present)
WATERSOURC:	The type of water source used for the delineated area
MULTIUSE:	Type of land uses within the delineated area

Appendix B

CLASS1:	The class for the first land use
SUBCLASS1:	The subclass for the first land use
SPECOND1:	The special condition for the first land use
IRR_TYP1:	Irrigated or non-irrigated, and irrigation system type for the first land use
PCNT1:	The percentage of land associated with the first land use
CLASS2:	The class for the second land use
SUBCLASS2:	The subclass for the second land use
SPECOND2:	The special condition for the second land use
IRR_TYP2:	Irrigated or non-irrigated, and irrigation system type for the second land use
PCNT2:	The percentage of land associated with the second land use
CLASS3:	The class for the third land use
SUBCLASS3:	The subclass for the third land use
SPECOND3:	The special condition for the third land use
IRR_TYP3:	Irrigated or non-irrigated, and irrigation system type for the third land use
PCNT3:	The percentage of land associated with the third land use

Information on the Shape Files:

Shape files were created for each quad, and one for the whole survey area. The naming convention used for the quad DWG files is used for the quad shape files (for example, 96SJ3327.shp, 96SJ3327.shx, and 96SJ3327.dbf for quad number 3327, the Stockton East quad). The name of the shape file for the whole survey area is 96SJ.shp (and .dbf and .shx). Following is an explanation of the land use attributes in the DBF files:

BL_X:	This is the X coordinate of the interior point in the delineated area
BL_Y:	This is the Y coordinate of the interior point in the delineated area
ACRES:	Number of acres in the delineated area (may or may not be present)
WATERSOURC:	The type of water source used for the delineated area
MULTIUSE:	Type of land uses within the delineated area
CLASS1:	The class for the first land use
SUBCLASS1:	The subclass for the first land use
SPECOND1:	The special condition for the first land use
IRR_TYP1A:	Irrigated or non-irrigated for the first land use
IRR_TYP1B:	Irrigation system type for the first land use
PCNT1:	The percentage of land associated with the first land use
CLASS2:	The class for the second land use
SUBCLASS2:	The subclass for the second land use
SPECOND2:	The special condition for the second land use
IRR_TYP2A:	Irrigated or non-irrigated for the second land use
IRR_TYP2B:	Irrigation system type for the second land use
PCNT2:	The percentage of land associated with the second land use
CLASS3:	The class for the third land use

Appendix B

SUBCLASS3:	The subclass for the third land use
SPECOND3:	The special condition for the third land use
IRR_TYP3A:	Irrigated or non-irrigated for the third land use
IRR_TYP3B:	Irrigation system type for the third land use
PCNT3:	The percentage of land associated with the third land use
UCF_ATT:	Concatenated attributes from MULTIUSE to PCNT3

Information on the JPEG Files:

JPEG files were created for each quad where there was a minimum of elevation changes. The naming convention used for the quad DWG files is used for the quad JPEG photoquad files (for example, 96SJ3327.jpg and 96SJ3327.jgw for quad number 3327, the Stockton East quad). The .jgw file is the JPEG world file.

Important Points about Using this Data Set:

1. The land use boundaries were either drawn on-screen using developed photoquads, or hand drawn directly on USGS quad maps and then digitized. They were drawn to depict observable areas of the same land use. They were not drawn to represent legal parcel (ownership) boundaries, or meant to be used as parcel boundaries.

2. This survey was a "snapshot" in time. The indicated land use attributes of each delineated area (polygon) were based upon what the surveyor saw in the field at that time, and, to an extent possible, whatever additional information the aerial photography might provide. For example, the surveyor might have seen a cropped field in the photograph, and the field visit showed a field of corn, so the field was given a corn attribute. In another field, the photograph might have shown a crop that was golden in color (indicating grain prior to harvest), and the field visit showed newly planted corn. This field would be given an attribute showing a double crop, grain followed by corn. The DWR land use attribute structure allows for up to three attributes per delineated area (polygon).

   In the cases where there were crops grown before the survey took place, the surveyor may or may not have been able to detect them from the field or the photographs. For crops planted after the survey date, the surveyor could not account for these crops. Thus, although the data is very accurate for that point in time, it may not be an accurate determination of what was grown in the fields for the whole year. If the area being surveyed does have double or multicropping systems, it is likely that there are more crops grown than could be surveyed with a "snapshot".

3. If the data is to be brought into a GIS for analysis of cropped (or planted) acreage, two things must be understood:

Appendix B

a. The acreage of each field delineated is the gross area of the field. The amount of actual planted and irrigated acreage will always be less than the gross acreage, because of ditches, farm roads, other roads, farmsteads, etc. Thus, a delineated corn field may have a GIS calculated acreage of 40 acres but will have a smaller cropped (or net) acreage, maybe 38 acres.

d. Double and multicropping must be taken into account. A delineated field of 40 acres might have been cropped first with grain, then with corn, and coded as such. To estimate actual cropped acres, the two crops are added together (38 acres of grain and 38 acres of corn) which results in a total of 76 acres of net crop (or planted) acres.

METADATA FOR THE 1994 FRESNO COUNTY LAND USE SURVEY DATA

Originator:

California Department of Water Resources

Abstract:

The 1994 Fresno County land use survey data set was developed by DWR through it's Division of Planning and Local Assistance. The data was gathered using aerial photography and extensive field visits, the land use boundaries and attributes were digitized, and the resultant data went through standard quality control procedures before finalizing. The land uses that were gathered were detailed agricultural land uses, and lesser detailed urban and native vegetation land uses. The data was gathered and digitized by staff of DWR's San Joaquin District and the quality control procedures were performed jointly by staff at DWR's DPLA headquarters from San Joaquin District.

The finalized data include DWG files (land use vector data) and shape files (land use vector data).

Purpose:

This data was developed to aid in DWR's efforts to continually monitor land use for the main purpose of determining the amount of and changes in the use of water.

DWR Contacts:

David Scruggs
San Joaquin District
3374 East Shields Avenue
Fresno, CA 93726-6990

Appendix B

559-230-3322
dscruggs@water.ca.gov

Tom Hawkins
DPLA Headquarters
1416 9th Street
Sacramento, CA 95814
916-653-5573
hawkins@water.ca.gov

Data Development:

1. The aerial photography used for this survey was taken in late June of 1994. The photographs (natural color slides taken from an altitude of about 5,500 feet above ground), were visually interpreted and land use boundaries were drawn on USGS paper 1:24,000 quadrangles.

2. The quad maps were taken to the field as field sheets, and virtually all the areas were visited to positively identify the land use. The site visits occurred in July through September 1994. Land use codes were printed within each area on the field sheets.

3. Using AUTOCAD, the land use boundaries and attributes were digitized (using a standardized digitizing process) from the field sheets on a digitizing tablet.

4. After quality control/assurance procedures were completed on each file (DWG), the data was finalized.

5. The linework and attributes from each DWG quad file were brought into ARCINFO and both quad and surveywide coverages were created, and underwent quality checks. These coverages were converted to shape files using ARCVIEW.

Data Accuracy:

The land use boundaries were hand drawn onto USGS 1:24,000 quads, and digitized on a digitizing tablet using AUTOCAD. For those areas where the lines were drawn onto USGS quads and digitized, the accuracy is less than that of the quads (about 50 foot accuracy).

The land use attribute accuracy is very high, because almost every delineated field was visited in the field. The accuracy is less than 100 percent because some errors must have occurred. There are three possible sources of attribute errors which are:

1) Misidentification of land use in the field (and entering that incorrect attribute on the field sheet);

2) Correct identification of land use, but entering an incorrect attribute on the field sheet, or;
3) Accidentally affixing an incorrect attribute during the digitizing process.

Projection Information:

The data (DWG and shape files) is in a transverse mercator projection, with identical parameters to UTM projections, except the central meridian is -120 degrees (120 degrees west). For comparison, UTM 10 has a central meridian of 123 degrees west, and UTM 11 has a central meridian of 117 degrees west. This projection allows virtually all of the geographic area of California to be in one 6 degree zone (as opposed to two zones, UTM 10 and 11).

Projection:	Transverse Mercator
Datum:	NAD27
Units:	Meter
Scale Reduction:	0.9996
Central Meridian:	120 degrees west
Origin Latitude:	0.00 N
False Easting:	500,000
False Northing:	0.00

Land Use Attributes:

All land use attributes were coded using the Department's Standard Land Use Legend dated July 1993 (93legend.pdf). The legend explains in detail how each delineated area is attributed in the field, and what the coding system is.

The actual land use code that is printed onto the field maps is different in arrangement than the codes that result from the digitizing process. The file attributes.pdf is a detailed explanation of the coding system used for both coding the field sheets, and the codes that end up in digitized form in the database files associated with the shape files.

Information on the AUTOCAD (DWG) Files:

The land use data is available in AUTOCAD 12 format by quad, with one file per quad. The file naming convention is 94FRXXXX.DWG, where XXXX is the DWR quadrangle number. For example, file 94FR4340.DWG is the AUTOCAD drawing file for the 1994 Fresno County land use survey for quadrangle 4340 (the Sanger quad).

Every quadrangle file has identical layers, nomenclature, and line colors. They are as follows:

Layer	Description	Color
0	AutoCAD's default layer	White
CQN	California DWR quad number	Cyan

Appendix B

GSN	USGS quad number	Cyan
LUB	Land use boundary lines	Yellow
LUC	Land use codes for GRASS	White
LUT	Visible land use text	Green
QB	The quad's boundary	White
QN	Quad name	Cyan

Following is an explanation of the attributes (for each delineated area) in the LUC layer of each quad file:

ACRES:	Number of acres in the delineated area (may or may not be present)
WATERSOURC:	The type of water source used for the delineated area
MULTIUSE:	Type of land uses within the delineated area
CLASS1:	The class for the first land use
SUBCLASS1:	The subclass for the first land use
SPECOND1:	The special condition for the first land use
IRR_TYP1:	Irrigated or non-irrigated, and irrigation system type for the first land use
PCNT1:	The percentage of land associated with the first land use
CLASS2:	The class for the second land use
SUBCLASS2:	The subclass for the second land use
SPECOND2:	The special condition for the second land use
IRR_TYP2:	Irrigated or non-irrigated, and irrigation system type for the second land use
PCNT2:	The percentage of land associated with the second land use
CLASS3:	The class for the third land use
SUBCLASS3:	The subclass for the third land use
SPECOND3:	The special condition for the third land use
IRR_TYP3:	Irrigated or non-irrigated, and irrigation system type for the third land use
PCNT3:	The percentage of land associated with the third land use

Information on the Shape Files:

Shape files were created for each quad, and one for the whole survey area. The naming conventions used for the quad DWG files is used for the quad shape files (for example, 94FR4340.shp, 94FR4340.shx, and 94FR4340.dbf for quad number 4340, the Sanger quad). The name of the shape file for the whole survey area is 94FR.shp (and .dbf and .shx). Following is an explanation of the land use attributes in the DBF files:

BL_X:	This is the X coordinate of the interior point in the delineated area
BL_Y:	This is the Y coordinate of the interior point in the delineated area
ACRES:	Number of acres in the delineated area (may or may not be present)
WATERSOURC:	The type of water source used for the delineated area
MULTIUSE:	Type of land uses within the delineated area

Appendix B

CLASS1:	The class for the first land use
SUBCLASS1:	The subclass for the first land use
SPECOND1:	The special condition for the first land use
IRR_TYP1A:	Irrigated or non-irrigated for the first land use
IRR_TYP1B:	Irrigation system type for the first land use
PCNT1:	The percentage of land associated with the first land use
CLASS2:	The class for the second land use
SUBCLASS2:	The subclass for the second land use
SPECOND2:	The special condition for the second land use
IRR_TYP2A:	Irrigated or non-irrigated for the second land use
IRR_TYP2B:	Irrigation system type for the second land use
PCNT2:	The percentage of land associated with the second land use
CLASS3:	The class for the third land use
SUBCLASS3:	The subclass for the third land use
SPECOND3:	The special condition for the third land use
IRR_TYP3A:	Irrigated or non-irrigated for the third land use
IRR_TYP3B:	Irrigation system type for the third land use
PCNT3:	The percentage of land associated with the third land use
UCF_ATT:	Concatenated attributes from MULTIUSE to PCNT3

Important Points about Using this Data Set:

1. The land use boundaries were hand drawn directly on USGS quad maps and then digitized. They were drawn to depict observable areas of the same land use. They were not drawn to represent legal parcel (ownership) boundaries, or meant to be used as parcel boundaries.

2. This survey was a "snapshot" in time. The indicated land use attributes of each delineated area (polygon) were based upon what the surveyor saw in the field at that time, and, to an extent possible, whatever additional information the aerial photography might provide. For example, the surveyor might have seen a cropped field in the photograph, and the field visit showed a field of corn, so the field was given a corn attribute. In another field, the photograph might have shown a crop that was golden in color (indicating grain prior to harvest), and the field visit showed newly planted corn. This field would be given an attribute showing a double crop, grain followed by corn. The DWR land use attribute structure allows for up to three attributes per delineated area (polygon).

   In the cases where there were crops grown before the survey took place, the surveyor may or may not have been able to detect them from the field or the photographs. For crops planted after the survey date, the surveyor could not account for these crops. Thus, although the data is very accurate for that point in time, it may not be an accurate determination of what was grown in the fields for the whole year. If the area being

surveyed does have double or multicropping systems, it is likely that there are more crops grown than could be surveyed with a "snapshot".

3. If the data is to be brought into a GIS for analysis of cropped (or planted) acreage, two things must be understood:

   a. The acreage of each field delineated is the gross area of the field. The amount of actual planted and irrigated acreage will always be less than the gross acreage, because of ditches, farm roads, other roads, farmsteads, etc. Thus, a delineated corn field may have a GIS calculated acreage of 40 acres but will have a smaller cropped (or net) acreage, maybe 38 acres.

   e. Double and multicropping must be taken into account. A delineated field of 40 acres might have been cropped first with grain, then with corn, and coded as such. To estimate actual cropped acres, the two crops are added together (38 acres of grain and 38 acres of corn) which results in a total of 76 acres of net crop (or planted) acres.

4. Water source and irrigation type information was not collected for this survey.

METADATA FOR THE 1996 STANISLAUS COUNTY LAND USE SURVEY DATA

Originator:

California Department of Water Resources

Date of Metadata:

August 1, 2000

Abstract:

The 1996 Stanislaus County land use survey data set was developed by DWR through it's Division of Planning and Local Assistance. The data was gathered using aerial photography and extensive field visits, the land use boundaries and attributes were digitized, and the resultant data went through standard quality control procedures before finalizing. The land uses that were gathered were detailed agricultural land uses, and lesser detailed urban and native vegetation land uses. The data was gathered and digitized by staff of DWR's San Joaquin District and the quality control procedures were performed jointly by staff at DWR's DPLA headquarters from San Joaquin District.
The finalized data include DWG files (land use vector data) and shape files (land use vector data).

Appendix B

Purpose:

This data was developed to aid in DWR's efforts to continually monitor land use for the main purpose of determining the amount of and changes in the use of water.

DWR Contacts:

David Scruggs
San Joaquin District
3374 East Shields Avenue
Fresno, CA 93726-6990
559-230-3322
dscruggs@water.ca.gov

Tom Hawkins
DPLA Headquarters
1416 9th Street
Sacramento, CA 95814
916-653-5573
hawkins@water.ca.gov

Data Development:

1. The aerial photography used for this survey was taken in late June of 1996. The photographs (natural color slides taken from an altitude of about 5,500 feet above ground), were visually interpreted and land use boundaries were drawn on USGS paper 1:24,000 quadrangles.

2. The quad maps were taken to the field as field sheets, and virtually all the areas were visited to positively identify the land use. The site visits occurred in July through September 1996. Land use codes were printed within each area on the field sheets.

3. Using AUTOCAD, the land use boundaries and attributes were digitized from the field sheets on a digitizing tablet.

4. After quality control/assurance procedures were completed on each file (DWG), the data was finalized.

5. The linework and attributes from each DWG quad file were brought into ARCINFO and both quad and surveywide coverages were created, and underwent quality checks. These coverages were converted to shape files using ARCVIEW.

Data Accuracy:

Appendix B

The land use boundaries were hand drawn onto USGS 1:24,000 quads, and digitized (using a standardized digitizing process) on a digitizing tablet using AUTOCAD. For those areas where the lines were drawn onto USGS quads and digitized, the accuracy is less than that of the quads (about 50 foot accuracy).

The land use attribute accuracy is very high, because almost every delineated field was visited in the field. The accuracy is less than 100 percent because some errors must have occurred. There are three possible sources of attribute errors which are:

1) Misidentification of land use in the field (and entering that incorrect attribute on the field sheet);
2) Correct identification of land use, but entering an incorrect attribute on the field sheet, or;
3) Accidentally affixing an incorrect attribute during the digitizing process.

Projection Information:

The data (DWG and shape files) is in a transverse mercator projection, with identical parameters to UTM projections, except the central meridian is -120 degrees (120 degrees west). For comparison, UTM 10 has a central meridian of 123 degrees west, and UTM 11 has a central meridian of 117 degrees west. This projection allows virtually all of the geographic area of California to be in one 6 degree zone (as opposed to two zones, UTM 10 and 11).

Projection: Transverse Mercator
Datum: NAD27
Units: Meter
Scale Reduction: 0.9996
Central Meridian: 120 degrees west
Origin Latitude: 0.00 N
False Easting: 500,000
False Northing: 0.00

Land Use Attributes:

All land use attributes were coded using the Department's Standard Land Use Legend dated July 1993 (93legend.pdf). The legend explains in detail how each delineated area is attributed in the field, and what the coding system is.

The actual land use code that is printed onto the field maps is different in arrangement than the codes that result from the
digitizing process. The file attributes.pdf is a detailed explanation of the coding system used for both coding the field sheets, and the codes that end up in digitized form in the database files associated with the shape files.

Appendix B

Information on the AUTOCAD (DWG) Files:

The land use data is available in AUTOCAD 12 format by quad, with one file per quad. The file naming convention is 96SSXXXX.DWG, where XXXX is the DWR quadrangle number. For example, file 96SS3629.DWG is the AUTOCAD drawing file for the 1996 Stanislaus County land use survey for quadrangle 3629 (the Ceres quad).

Every quadrangle file has identical layers, nomenclature, and line colors. They are as follows:

Layer	Description	Color
0	AutoCAD's default layer	White
CQN	California DWR quad number	Cyan
GSN	USGS quad number	Cyan
LUB	Land use boundary lines	Yellow
LUC	Land use codes for GRASS	White
LUT	Visible land use text	Green
QB	The quad's boundary	White
QN	Quad name	Cyan

Following is an explanation of the attributes (for each delineated area) in the LUC layer of each quad file:

ACRES:	Number of acres in the delineated area (may or may not be present)
WATERSOURC:	The type of water source used for the delineated area
MULTIUSE:	Type of land uses within the delineated area
CLASS1:	The class for the first land use
SUBCLASS1:	The subclass for the first land use
SPECOND1:	The special condition for the first land use
IRR_TYP1:	Irrigated or non-irrigated, and irrigation system type for the first land use
PCNT1:	The percentage of land associated with the first land use
CLASS2:	The class for the second land use
SUBCLASS2:	The subclass for the second land use
SPECOND2:	The special condition for the second land use
IRR_TYP2:	Irrigated or non-irrigated, and irrigation system type for the second land use
PCNT2:	The percentage of land associated with the second land use
CLASS3:	The class for the third land use
SUBCLASS3:	The subclass for the third land use
SPECOND3:	The special condition for the third land use
IRR_TYP3:	Irrigated or non-irrigated, and irrigation system type for the third land use
PCNT3:	The percentage of land associated with the third land use

Information on the Shape Files:

Appendix B

Shape files were created for each quad, and one for the whole survey area. The naming conventions used for the quad DWG files is used for the quad shape files (for example, 96SS3629.shp, 96SS3629.shx, and 96SS3629.dbf for quad number 3629, the Ceres quad). The name of the shape file for the whole survey area is 96SS.shp (and .dbf and .shx). Following is an explanation of the land use attributes in the DBF files:

BL_X:	This is the X coordinate of the interior point in the delineated area
BL_Y:	This is the Y coordinate of the interior point in the delineated area
ACRES:	Number of acres in the delineated area (may or may not be present)
WATERSOURC:	The type of water source used for the delineated area
MULTIUSE:	Type of land uses within the delineated area
CLASS1:	The class for the first land use
SUBCLASS1:	The subclass for the first land use
SPECOND1:	The special condition for the first land use
IRR_TYP1A:	Irrigated or non-irrigated for the first land use
IRR_TYP1B:	Irrigation system type for the first land use
PCNT1:	The percentage of land associated with the first land use
CLASS2:	The class for the second land use
SUBCLASS2:	The subclass for the second land use
SPECOND2:	The special condition for the second land use
IRR_TYP2A:	Irrigated or non-irrigated for the second land use
IRR_TYP2B:	Irrigation system type for the second land use
PCNT2:	The percentage of land associated with the second land use
CLASS3:	The class for the third land use
SUBCLASS3:	The subclass for the third land use
SPECOND3:	The special condition for the third land use
IRR_TYP3A:	Irrigated or non-irrigated for the third land use
IRR_TYP3B:	Irrigation system type for the third land use
PCNT3:	The percentage of land associated with the third land use
UCF_ATT:	Concatenated attributes from MULTIUSE to PCNT3

Important Points about Using this Data Set:

1. The land use boundaries were hand drawn directly on USGS quad maps and then digitized. They were drawn to depict observable areas of the same land use. They were not drawn to represent legal parcel (ownership) boundaries, or meant to be used as parcel boundaries.

2. This survey was a "snapshot" in time. The indicated land use attributes of each delineated area (polygon) were based upon what the surveyor saw in the field at that time, and, to an extent possible, whatever additional information the aerial photography might provide. For example, the surveyor might have seen a cropped field in the photograph, and the field visit showed a field of corn, so the field was given a corn attribute. In another field, the photograph might have shown a crop that was golden in color (indicating grain prior to

harvest), and the field visit showed newly planted corn. This field would be given an attribute showing a double crop, grain followed by corn. The DWR land use attribute structure allows for up to three attributes per delineated area (polygon). In the cases where there were crops grown before the survey took place, the surveyor may or may not have been able to detect them from the field or the photographs. For crops planted after the survey date, the surveyor could not account for these crops. Thus, although the data is very accurate for that point in time, it may not be an accurate determination of what was grown in the fields for the whole year. If the area being surveyed does have double or multicropping systems, it is likely that there are more crops grown than could be surveyed with a "snapshot".

3. If the data is to be brought into a GIS for analysis of cropped (or planted) acreage, two things must be understood:

    a. The acreage of each field delineated is the gross area of the field. The amount of actual planted and irrigated acreage will always be less than the gross acreage, because of ditches, farm roads, other roads, farmsteads, etc. Thus, a delineated corn field may have a GIS calculated acreage of 40 acres but will have a smaller cropped (or net) acreage, maybe 38 acres.

    b. Double and multicropping must be taken into account. A delineated field of 40 acres might have been cropped first with grain, then with corn, and coded as such. To estimate actual cropped acres, the two crops are added together (38 acres of grain and 38 acres of corn) which results in a total of 76 acres of net crop (or planted) acres.

4. Water source and irrigation type information was not collected for this survey.

County Coverages

LIBRARY : COUNTY, CA
LAYER NAME : COUNTY
COVERAGE NAME : CO100A

COVERAGE DESCRIPTION:

The 'COUNTY' layer contains county lines and features (usually shorelines). The county outline was digitized from 1:100,000 scale mylar USGS quad sheets.

Users can draw this layer instead of using the tile boundary (which is also a county line). Users can display shorelines or legal county lines or both by employing the BAY and DISPLAY items. This is a polygon layer; users should be prepared for counties with multiple polygons.

VITAL STATISTICS:

Appendix B

Datum:	NAD 27
Projection:	Albers
Units:	Meters
1st Std. Parallel:	34 00 00 (34.0 degrees N)
2nd Std. Parallel:	40 30 00 (40.5 degrees N)
Longitude of Origin:	-120 00 00 (120.0 degrees W)
Latitude of Origin:	00 00 00 (0.0 degrees)
Latitude of Origin:	00 00 00
False Easting (X shift):	0
False Northing (Y shift):	-4,000,000
Source:	USGS digital line graph (DLG) digital series
Source Media:	Mylar maps
Source Projection:	Universal Transverse Mercator Zones 10 & 11
Source Units:	Digitizer inches
Source Scale:	1:100,000 derived from 1:24,000 sources
Capture Method:	Digitized on Calcomp 9100

Conversion Software:	ARC/INFO rev. 5.0.1
Data Structure:	Vector
ARC/INFO Coverage Type:	Polygon
ARC/INFO Precision:	Single
ARC/INFO Tolerances:	5 meters
Number of Features:	112
Layer Size:	6.191 MB
Data Updated:	April 1999 (County swaps Kern/Ventura and Orange/Riverside)

DATA DICTIONARY:

DATAFILE NAME:	CO100A.PAT
RECORD LENGTH:	49

COLUMN	ITEM NAME	WIDTH	OUTPUT	TYPE	N.DEC
1	AREA	8	18	F	5
9	PERIMETER	8	18	F	5
17	CO100A#	4	5	B	-
21	CO100A-ID	4	5	B	-
25	NAME	20	20	C	-
45	NUM	2	2	I	-
47	BAY	1	1	I	-
48	DISPLAY	2	2	I	-

Appendix B

AREA : The area of the polygon in square coverage units.

PERIMETER : The length of the polygon perimeter of the polygon in coverage units.

CO100A# : The software-assigned unique integer identification number.

CO100A-ID : A user-assigned identifier number.

NAME: County name

NUM: County number (sequence number when counties are listed alphabetically by name)

01 ALAMEDA
02 ALPINE
03 AMADOR
04 BUTTE
05 CALAVERAS
06 COLUSA
07 CONTRA COSTA
08 DEL NORTE
09 EL DORADO
10 FRESNO
11 GLENN
12 HUMBOLDT
13 IMPERIAL
14 INYO
15 KERN
16 KINGS
17 LAKE
18 LASSEN
19 LOS ANGELES
20 MADERA
21 MARIN
22 MARIPOSA
23 MENDOCINO
24 MERCED
25 MODOC
26 MONO
27 MONTEREY
28 NAPA
29 NEVADA
30 ORANGE

Appendix B

31 PLACER
32 PLUMAS
33 RIVERSIDE
34 SACRAMENTO
35 SAN BENITO
36 SAN BERNARDINO
37 SAN DIEGO
38 SAN FRANCISCO
39 SAN JOAQUIN
40 SAN LUIS OBISPO
41 SAN MATEO
42 SANTA BARBARA
43 SANTA CLARA
44 SANTA CRUZ
45 SHASTA
46 SIERRA
47 SISKIYOU
48 SOLANO
49 SONOMA
50 STANISLAUS
51 SUTTER
52 TEHAMA
53 TRINITY
54 TULARE
55 TUOLUMNE
56 VENTURA
57 YOLO
58 YUBA

BAY: This item differentiates between mainland, island and water polygons within a county.

0 = Mainland
1 = Water
2 = Island

DISPLAY: Counties are sometimes comprised of several polygons. The one largest polygon per county is coded with the number 1 . The remaining polygons are coded with the number 0. This is useful when using polygontext commands so that county names will be displayed only once per county.

DATA QUALITY ASSESSMENT:

The following are subjective comments regarding this data.

Appendix B

This layer is complete and the accuracy is good. Attributes which are present are necessary for resolution of county line subsets, i.e., bay shorelines, and the accuracy is excellent.

DATA CONTACT:

Contact Name: Steve Flatt
Contact's Phone: 916-464-4584

DOCUMENTATION DATES: edited 10/27/1997, 8/1998, 4/1999, 5/1999

NOTE: Quad-specific metadata files are not yet available.

CALIFORNIA CENTRAL VALLEY WETLANDS AND RIPARIAN GIS DEPARTMENT OF FISH AND GAME METADATA

July 2, 1997

NOTES TO USERS:

By accepting the California Central Valley Wetlands and Riparian GIS data, the user agrees to the following terms:

* The data may not be used for regulatory purposes.
* The data may not be redistributed without prior written approval from the Coordinator of the Wetlands Inventory and Conservation Program.
* Graphic or textual representations of this data shall include appropriate references to the source, authors, and agencies.
* The version of the data used shall be listed in any report, analysis, or map using the data.
* The data shall not be amended, edited, or revised, nor shall it be used inappropriately to produce inaccurate, incomplete, or misleading analyses, reports, or maps.

HOW TO OBTAIN MORE INFORMATION

The California Central Valley Wetlands and Riparian GIS data may be obtained either electronically, or by mail.

To obtain the data electronically, please do the following by email to mtuffly@.dfg.ca.gov:

* Provide your name, affiliation, address, telephone number, fax number, and email address.
* Briefly describe how you will use the data.

To obtain the data by mail, please do the following:

Appendix B

Send a written request containing the above information requested for electronic transfers, and a self-addressed envelope with return postage containing a blank 8mm tape or blank writeable compact disc to:

Michael Tuffly
Department of Fish and Game
Wetlands Inventory and Conservation Program
1416 Ninth Street
Sacramento, CA 95814

For additional information about obtaining the data electronically or by mail, please contact Michael Tuffly at (916) 445-6264 or email: mtuffly@.dfg.ca.gov

For information about the methods used to construct this data set, please contact Kari Lewis, Department of Fish and Game, Natural Heritage Division, 1416 Ninth Street, Sacramento, CA 95814. (916) 322-1869 email: klewis@kirk.dfg.ca.gov

IMAGE LAYER NAME:	wetlands	(entire study area; Cental Valley)
	north	(Northern extent of study area)
	bayarea	(San Francisco Bayarea extent of study area)
	central	(Middle Cental Valley extent of Study area)
	south	(Southern extent of Study area)

IMAGE DESCRIPTION:
The Wetlands and Riparian GIS database was developed to inventory wetlands, riparian woody areas, and surrounding landcover in three key regions in California:
1) the Sacramento Valley, 2) the San Francisco Bay/Delta, and 3)the San Joaquin Valley to support cooperative conservation planning and wetland resource protection efforts of state, federal, and local agencies and private organizations. This database was produced using image processing techniques to classify satellite imagery. For the three regions, Landsat Thematic Mapper satellite imagery was processed to map land cover classes from three broad categories: wetlands, agriculture, and uplands.

A cooperative grant from the Department of Fish and Game (using funds from the U.S. Environmental Protection Agency), the Wildlife Conservation Board, the Resources Agency of California, and the U.S. Bureau of Reclamation funded the development of this GIS database by Ducks Unlimited, Inc. and their subcontractor Pacific Meridian Resources in cooperation with DFG, WCB, and BOR staff.

Note, this is a description for the entire grid (grid name: WETLANDS). STATISTICS, BOUNDARY, and Number of Rows and Number of Columns will vary.COORDINATE SYSTEM, Cell Size, Minimum Value, Maximum Value will be the same.

Appendix B

IMAGE TYPE: Raster

IMAGE FORMAT: ARC/INFO GRID

Cell Size =	30.988	Data Type:	Integer
Number of Rows =	18874	Number of Values =	18
Number of Columns =	13340	Attribute Data (bytes) =	8

BOUNDARY		STATISTICS	
Xmin =	-276494.330	Minimum Value =	0.000
Xmax =	136880.970	Maximum Value =	17.000
Ymin =	-334767.041	Mean =	2.236
Ymax =	250093.934	Standard Deviation =	5.057

COORDINATE SYSTEM DESCRIPTION

Projection	ALBERS		
Units	METERS	Spheroid	CLARKE1866
Parameters:			
1st standard parallel		34 0 0.000	
2nd standard parallel		40 30 0.000	
central meridian		-120 0 0.00	
latitude of projection's origin		0 0 0.000	
false easting (meters)		0.00000	
false northing (meters)		-4000000.0000	

Datum: NAD27
Spheroid: Clark 1866

SOURCE: Natural Heritage Division, California Department of Fish and Game

SOURCE DATA: Landsat Thematic Mapper Satellite Imagery and SPOT Multispectral Satellite Imagery. The sensor and dates of image acquisition are listed below.

Area	Summer	Winter
Sacramento Valley	Landsat TM 6/28/93	Landsat TM 1/3/93
San Francisco Bay/Delta	Landsat TM 6/28/93	Landsat TM 1/3/93
N. San Joaquin Valley	Landsat TM 7/7/93	Landsat TM 11/9/86 and SPOT 11/13/90

Appendix B

S. San Joaquin Valley	Landsat TM 6/30/93	Landsat TM 12/20/92
Vina Plains	Landsat TM 6/28/93	Landsat TM 1/3/93

LOOK UP TABLE (named WET_LUT)

Record	VALUE	SYMBOL TEXT
1	0 65	Outside Study Area
2	1 72	Open Water
3	2 67	Seasonally Flooded Estuarine Emergents
4	3 96	Permanently Flooded Estuarine Emergents
5	4 120	Tidal Estuarine Emergents
6	5 109	Seasonally Flooded Palustrine Emergents
7	6 128	Permanently Flooded Palustrine Emergents
8	7 292	Tidal Flats
9	8 355	Non-Tidal Flats
10	9 454	Flooded Agriculture
11	10 451	Seasonally Flooded Agriculture
12	11 457	Non-Flooded Agriculture
13	12 410	Orchards/Vineyards
14	13 408	Riparian Woody
15	14 569	Non-Riparian Woody
16	15 466	Grass
17	16 211	Barren
18	17 202	Other

Descriptions of each of the categories in the classification system are listed below. Note the values in parentheses correspond to the values in the Look Up Table (LUT), Value Attribute Table (VAT), and Image cell values in the VALUE data field.

1. (1) Open Water - Open water features (both fresh and salt water) that were identified on the summer image only.

2.1.1 (2) Seasonally Flooded Estuarine Emergents* - emergent vegetation identified as: a) dry (i.e. no flooding or moist soil) on the summer image, b) inundated on the winter image, and c) within areas classified as Estuarine by the National Wetlands Inventory. Examples of estuarine emergents are pickleweed and saltgrass. This class may include areas which are subject to freshwater runoff or managed by means of fresh water flooding and support brackish or freshwater habitats, such as areas of Suisun Marsh.

2.1.2 (3) Permanently Flooded Estuarine Emergents* - wetland emergent vegetation identified as: a) flooded or having moist soil on the summer image and thus assumed to also be flooded or moist in the winter, and b) within areas classified as Estuarine by the

National Wetlands Inventory. Examples of estuarine emergents are pickleweed and saltgrass. This class may include areas which are subject to freshwater runoff or managed by means of freshwater flooding and support brackish or freshwater habitats, such as areas of Suisun Marsh.

*Areas labeled as Estuarine which are managed for brackish or fresh water habitat can vary in seasonality of flooding and in geographic location and extent based on varying management schemes.

2.1.3 (4) Tidal Estuarine Emergents - wetland emergent vegetation identified within areas classified as Tidal by the San Francisco Estuary Institute Baylands Atlas data and classified as Estuarine by the National Wetlands Inventory. Examples of tidal estuarine emergents are pickleweed and saltgrass.

2.2.1 (5) Seasonally Flooded Palustrine Emergents** - emergent vegetation identified as: a) dry (i.e. no flooding or moist soil) on the summer image, b) inundated on the winter image, and c) within areas classified as Palustrine, Lacustrine, or Riverine by the National Wetlands Inventory or outside of any areas classified as Estuarine by the National Wetlands Inventory. This class includes areas that were managed as moist soil habitat for waterfowl. Typical vegetation includes swamp timothy, pricklegrass, and watergrass.

2.2.2 (6) Permanently Flooded Palustrine Emergents** - wetland emergent vegetation identified as: a) flooded or having moist soil on the summer image and thus assumed to also be flooded or moist in the winter, and b) within areas classified as Palustrine, Lacustrine, or Riverine by the National Wetlands Inventory or outside of any areas classified as Estuarine by the National Wetlands inventory. Typical vegetation in this class includes bulrushes and cattails. Managed wetlands where summer water was visible were included in this class.

**Managed areas labeled as seasonally or permanently flooded palustrine can vary in seasonality of flooding and geographic location and extent based on varying management schemes.

2.3.1 (7) Tidal Flats - mud banks, and sand bars that were visible above the water level on the summer image and are subject to tidal influence.

2.3.2 (8) Non-Tidal Flats - mud banks, and sand bars that were visible above the water level on the summer image and are not subject to tidal influence.

3.1 (9) Flooded Agriculture - Agricultural lands where standing water or very moist soil was present on both the winter and summer images. This includes immature rice fields

where the rice plant was not yet fully emergent above the water on the summer image and were inundated on the winter image.

3.2 (10) Seasonally Flooded Agriculture - Agricultural lands where standing water was present on the winter image and growing crops were present on the summer image. Mature rice fields and other crops with winter flooding regimes were included in this class.

3.3 (11) Non-Flooded Agriculture - Agricultural lands with growing crops present in the summer and no flooding detected on either the summer or winter image. Row crops and other non-flooded agriculture were included in this class.

3.4 (12) Orchards/Vineyards - Orchards include almonds, walnuts, and various fruits grown in the agricultural areas of the Central Valley and in the valleys north of the Bay area. Vineyards are included in this class.

4.1 (13) Riparian Woody - areas dominated by woody scrub/shrub vegetation and trees that are located within a riparian mask based on proximity to selected hydrography features from the CDFG Rivers Assessment data, NWI data, Natural Diversity Data Base (NDDB), and a hand-digitized floodplain map. The parameters used to define the mask were tailored to reflect differences in riparian forest habitats in three ecological regions found within the project area. These parameters are discussed in detail in Section 8 of the final project report.

4.2 (14) Non-riparian Woody - areas dominated by woody scrub/shrub vegetation and trees that were not included in the Riparian Woody class. Residential areas with significant tree cover are included in this class.

5. (15) Grass - includes managed grasslands, such as pasture, golf courses, and schoolyards, and natural grasslands such as those found in the foothills.

6. (16) Barren - exposed soil with little or no vegetation present. This class includes fallow or recently plowed fields. Some barren land may have been classified as Other.

7. (17) Other - includes areas of urban and suburban development, industrial complexes, commercial centers, airport runways, and other areas dominated by structures and paved surfaces. Some areas of development may have been classified as Barren.

METHODS:

The Wetland and Riparian GIS database was produced from satellite imagery using image classification techniques. A multi-temporal approach involving the use of imagery from both the summer and the winter was implemented to take advantage of the seasonal wetland characteristics which allow for a more detailed classification than characteristics observed during

a single season. Ten Landsat Thematic Mapper images--a summer and winter scene from five scene locations--were acquired to cover the project area. In addition, a SPOT multispectral image was purchased for the N. San Joaquin Valley to provide a more recent winter image for the major wetlands areas than was available from the Landsat TM sensor.

Image processing techniques were used to classify the satellite images to produce the final GIS data layer. Initially, the winter image was classified to produce a digital map of winter standing water. This "winter wet" layer was then used along with Digital National Wetlands Inventory (NWI) data and Department of Conservation Farmlands Mapping and Monitoring data to stratify the summer image into three broad landcover classes: wetlands, agriculture, and non-agriculture uplands. After stratification, each image strata was classified separately using a combination of supervised and unsupervised classification techniques. Field data, aerial photography, and other ancillary data sources were used to assist in the labeling of spectral clusters.

After each of the strata was classified, they were mosaicked together and three GIS modeling operations were performed to further refine the classification. First, modeling with the "winter wet" layer was performed to identify and label seasonally flooded agriculture and seasonally flooded wetlands. Next, NWI data and SFEI Baylands Atlas data were used to apply wetland system labels (Estuarine vs. Palustrine) and a secondary Tidal attribute, respectively, to the wetlands identified during image classification. Finally, GIS modeling was performed to identify a riparian woody class. A mask of potential riparian areas was generated using NWI data, CDFG River Reach Hydrography Data, the Natural Diversity Data Base, and a manually digitized floodplain coverage. This mask was overlaid over the classified map and any woody areas falling within the mask were included in the riparian woody class.

ASSESSMENT OF DATA QUALITY:
Because of the use of multiple dates of imagery, the seasonal nature of many of the classes, and limited access to private lands, it was not possible to acquire the reference data needed for a rigorous, quantitative accuracy assessment. Instead, a review process was adopted in which persons familiar with the landcover of the project area reviewed draft maps and provided comments on problems they identified in the maps. These comments served as an important qualitative accuracy assessment and targeted systematic errors that were corrected during the final editing process.

APPROPRIATE USE OF COVERAGE/CLASSIFIED IMAGE:
The Wetlands and Riparian GIS database is designed for use in statewide and regional level planning. Due to its scale and scope, the Wetland and Riparian GIS database will meet different needs with various levels of success. Because of the relatively large scope of the database, it will likely meet the needs of coarser level planning efforts (planning efforts over a large area) with greater success than it will for finer level planning efforts, such as those occurring at the local level. For coarse level planning, the database provides information that is relatively uniform in coverage, date, and scale, useful for statewide and regional level planning. The benefits of covering a large area in a uniform manner may come at a cost in terms of accuracy in

some cases. Over a large project area such as the Central Valley, it is not possible to consider all areas in great detail, and in some cases, local subtleties in cover or management may not be represented. Thus, for finer level planning, the database will likely best be used as a general baseline to focus gathering of more detailed information and to fill gaps until such information can be assimilated. The effects of error in the data are also related to the scale at which the information is used. Errors may become increasingly significant as the information is used for finer levels of analysis. Classification errors which appear minimal at the state-wide or regional level may be significant when the data are used at a finer level. These issues of scale and accuracy require consideration by those who use the database for conservation planning and resource protection analysis.

In addition, the user should be aware of several limitations of the data. First, the seasonally floodeded wetlands and agriculture classes were identified using a single date of imagery. Second, a number of ancillary data layers were incorporated into the processing either for stratification or for GIS modeling. While these layers contributed greatly to the overall accuracy of the final data base, they also may have introduced error. Finally, the riparian class was modeled based on ancillary data and proximity modeling. Thus accurate representation of riparian habitat may not have been entirely achieved.

The information contained in, or derived from this data layer is unsuited for, and shall not be used for any regulatory purpose or action, nor shall the report or accompanying maps be the basis for any determination relating to impact assessment or mitigation.

USE OF DATA FOR DISPLAY AND ANALYSIS:
To display the classified image in IMAGINE, open a Viewer by clicking on the Viewer icon on the IMAGINE main menu bar. In the menu bar at the top of the Viewer, select File --> Raster --> Open. The Open Raster Layer dialog box will appear. Input the name of the image to be displayed and turn on the Fit to Frame button under Display Options to have the image fit the maximum extent of the Viewer. Click on OK to display the image.

ACCURACY ASSESSMENT:
Currently Accuracy is underway. Results will be completed in the Spring of 1998.

California Central Valley Wetlands and Riparian GIS
Metadata
July, 2, 1997

Appendix B

National Wetlands Inventory (NWI) Metadata

1 Identification Information

1.1 Citation

1.1.1 Originator: U.S. Fish & Wildlife Service, National Wetlands Inventory

1.1.2 Publication Date: Range from Oct. 1981 to present; information for this element varies for each 7.5' quad. See the quad-specific metadata file.

1.1.3 Title: Information for this element varies for each 7.5' quad. See the quad-specific metadata file.

1.1.4 Publication Information

1.1.4.1 Publication Place: St. Petersburg, Florida

1.1.4.2 Publisher: U.S. Fish & Wildlife Service, National Wetlands Inventory

1.2 Description

1.2.1 Abstract: NWI digital data files are records of wetlands location and classification as defined by the U.S. Fish & Wildlife Service. This dataset is one of a series available in 7.5 minute by 7.5 minute blocks containing ground planimetric coordinates of wetlands point, line, and area features and wetlands attributes. When completed, the series will provide coverage for all of the contiguous United States, Hawaii, Alaska, and U.S. protectorates in the Pacific and Caribbean. The digital data as well as the hardcopy maps that were used as the source for the digital data are produced and distributed by the U.S. Fish & Wildlife Service's National Wetlands Inventory project.

1.2.2 Purpose: The data provide consultants, planners, and resource managers with information on wetland location and type. The data were collected to meet U.S. Fish & Wildlife Service's mandate to map the wetland and deepwater habitats of the United States. The purpose of this survey was not to map all wetlands and deepwater habitats of the United States, but rather to use aerial photo interpretation techniques to produce thematic maps that show, in most cases, the larger ones and types that can be identified by such techniques. The objective was to provide better geospatial information on wetlands than

found on the U.S. Geological Survey topographic maps. It was not the intent of the NWI to produce maps that show exact wetland boundaries comparable to boundaries derived from ground surveys. Boundaries are therefore generalized in most cases. Consequently, the quality of the wetland data is variable mainly due to source photography, ease or difficulty of interpreting specific wetland types, and survey methods (e.g., level of field effort and state-of-the-art of wetland delineation) (see section on “Completenesss Report" for more information.

1.3 Time Period of Content

1.3.1 Multiple Dates/Time

1.3.1.1 Calendar Date: Ranges from Feb. 1971 to Dec. 1992. Information for this element varies for each 7.5' quad. See the quad-specific metadata file.

1.3.2 Currentness Reference: source photography date

1.4 Status

1.4.1 Progress: Complete

1.4.2 Maintenance and Update Frequency: Irregular

1.5 Spatial Domain

1.5.1 Bounding Coordinates

1.5.1.1 West Bounding Coordinate: Information for this element varies for each 7.5' quad. See the quad-specific metadata file.

1.5.1.2 East Bounding Coordinate: Information for this element varies for each 7.5' quad. See the quad-specific metadata file.

1.5.1.3 North Bounding Coordinate: Information for this element varies for each 7.5' quad. See the quad-specific metadata file.

1.5.1.4 South Bounding Coordinate: Information for this element varies for each 7.5' quad. See the quad-specific metadata file.

1.6 Keywords

1.6.1 Theme

Appendix B

1.6.1.1 Theme Keyword Thesaurus: None

1.6.1.2 Theme Keyword: wetlands

1.6.1.2 Theme Keyword: hydrologic

1.6.1.2 Theme Keyword: land cover

1.6.1.2 Theme Keyword: surface and manmade features

1.6.2 Place

1.6.2.1 Place Keyword Thesaurus: None

1.6.2.2 Place Keyword: Range includes all 50 states, Puerto Rico, Virgin Islands. Information for this element varies for each 7.5' quad. See the quad-specific metadata file.

1.7 Access Constraints: none

1.8 Use Constraints: Federal, State, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, State, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate Federal, State, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

The NWI maps do not show all wetlands since the maps are derived from aerial photo interpretation with varying limitations due to scale, photo quality, inventory techniques, and other factors. Consequently, the maps tend to show wetlands that are readily photo interpreted given consideration of photo and map scale. In general, the older NWI maps prepared from 1970s-era black and white photography (1:80,000 scale) tend to be very conservative, with many forested and drier-end emergent wetlands (e.g., wet meadows) not mapped. Maps derived from color infrared photography tend to yield more accurate results except when this photography was captured during a dry year, making wetland identification equally difficult. Proper use of NWI maps therefore

requires knowledge of the inherent limitations of this mapping. It is suggested that users also consult other information to aid in wetland detection, such as U.S. Department of Agriculture soil survey reports and other wetland maps that may have been produced by state and local governments, and not rely solely on NWI maps. See section on "Completeness Report" for more information. Also see an article in the National Wetlands Newsletter (March-April 1997; Vol. 19/2, pp. 5-12) entitled "NWI Maps: What They Tell Us" (a free copy of this article can be ordered from U.S. Fish and Wildlife Service, ES-NWI, 300 Westgate Center Drive, Hadley, MA 01035).

1.9 Point of Contact

10.2 Contact Organization Primary

10.1.2 Contact Organization: U.S. Fish & Wildlife Service, National Wetlands Inventory

10.3 Contact Position: Chief Cartographer

10.4 Contact Address

10.4.1 Address Type: mailing and physical address

10.4.2 Address: 9720 Executive Center Drive

10.4.3 City: St. Petersburg

10.4.4 State or Province: Florida

10.4.5 Postal Code: 33702

1.13 Native Data Set Environment: NWI uses Wetlands Analytical Mapping System (WAMS) software version 4.06 running under the SUNOS 4.x operating system to digitize wetlands information.

2 Data Quality Information

2.1 Attribute Accuracy

2.1.1 Attribute Accuracy Report: Attribute accuracy is tested by manual comparison of the source with hard copy printouts and/or symbolized display of the digital wetlands data on an interactive computer graphic system. In addition, WAMS software

(USFWS-NWI) tests the attributes against a master set of valid wetland attributes.

2.2 Logical Consistency Report: Polygons intersecting the neatline are closed along the border. Segments making up the outer and inner boundaries of a polygon tie end-to-end to completely enclose the area. Line segments are a set of sequentially numbered coordinate pairs. No duplicate features exist nor duplicate points in a data string. Intersecting lines are separated into individual line segments at the point of intersection. Point data are represented by two sets of coordinate pairs, each with the same coordinate values. All nodes are represented by a single coordinate pair which indicates the beginning or end of a line segment. The neatline is generated by connecting the four corners of the digital file, as established during initialization of the digital file. All data crossing the neatline are clipped to the neatline and data within a specified tolerance of the neatline are snapped to the neatline. Tests for logical consistency are performed by WAMS verification software (USFWS-NWI).

2.3 Completeness

All photo interpretable wetlands are mapped given considerations of map and photo scale and state-of-the-art wetland delineation techniques. The target mapping unit is an estimate of the minimum-sized wetland that should be consistently mapped. It is not the smallest wetland that appears on the map, but instead it is the size class of the smallest group of wetlands that NWI attempts to map consistently. Users must realize however that some wetland types are conspicuous and readily identified (e.g., ponds) and smaller wetlands of these types may be mapped. Other types (drier-end wetlands and forested wetlands, especially evergreen types) are more difficult to photo interpret and larger ones may be missed. In forested regions, the target mapping unit varies with the scale of the aerial photographs given acceptable quality (e.g., captured during spring, leaf-off condition for deciduous trees), as follows for the Northeast, Southeast, and Northwest: 1:80,000 = 3-5 acres; 1:58,000 = 1-3 acres, and 1:40,000 = 1 acre. This means that where 1:58,000 photography was used, the NWI maps should show most wetlands larger than 1-3 acres. In the treeless prairies (e.g., Upper Midwest), 1/4-acre wetlands are typically mapped due to the openness of the terrain and occurrence of wetlands in distinct depressions. In forested regions, small open water and emergent wetlands may also be mapped where conspicuous. For Alaska, the target mapping unit is 2-5 acres, while for the Southwest, 1-3 acres is the target. Map users must pay close attention to the photo scale used to prepare the maps. Also, users should be aware that black and white imagery tends to yield more conservative interpretations than color infrared imagery, except when the latter was acquired during a dry year, complicating wetland detection. In most areas, farmed wetlands are not

mapped, with exceptions including prairie pothole-type wetlands, cranberry bogs, and diked former tidelands in the Sacramento valley. Mucklands and other farmed wetlands are usually not shown on the maps. As mentioned in the "Use Constraints" section, no attempt was made to separate regulated wetlands from other wetlands, as these decisions must be based on criteria established by Federal and state regulatory agencies. Maps produced by photo interpretation techniques will never be as accurate as a detailed on-the-ground delineation, so the boundaries on the NWI maps should be considered generalized, especially in areas of low topographic relief (e.g., coastal plains and glaciolacustrine plains). Partly drained wetlands may also be conservatively mapped, since they may be difficult to photo interpret and in many cases, require site-specific assessment for validation. For more information on the limitations of NWI maps, consult "NWI Maps: What They Tell Us" (National Wetlands Newsletter Vol 19/2, March-April 1997, pp. 7-12; a copy can be obtained from the U.S. Fish and Wildlife Service, ES-NWI, 300 Westgate Center Drive, Hadley, MA 01035).

Positional Accuracy

Horizontal Positional Accuracy

Horizontal Positional Accuracy Report: Horizontal positional accuracy for the digital data is tested by visual comparison of the source with hard copy plots.

2.5 Lineage

2.5.1 Source Information

2.5.1.1 Source Citation

8.1 Originator: Domain includes U.S. Geological Survey (USGS), U.S. Department of Agriculture (USDA), National Aeronautics and Space Administration (NASA), special project. Information for this element varies for each 7.5' quad. See the quad-specific metadata file.

8.2 Publication Date: Ranges from Feb. 1971 to Dec. 1992. Information for this element varies for each 7.5' quad. See the quad-specific metadata file.

8.4 Title: Domain includes National Aerial Photography Program (NAPP), National High Altitude Photography (NHAP), Agricultural and Stabilization Conservation Service (ASCS), NASA or special project photography. Information for this element varies for each 7.5' quad. See the quad-specific metadata file.

8.6 Geospatial Data Presentation Form: aerial photograph

Appendix B

2.5.1.2 Source Scale Denominator: Ranges from 20,000 to 132,000. Information for this element varies for each 7.5' quad. See the quad-specific metadata file.

2.5.1.3 Type of Source Media: Domain includes black and white, color infrared, or natural color aerial photograph film transparency. Information for this element varies for each 7.5' quad. See the quad-specific metadata file.

2.5.1.4 Source Time Period of Content

9.2 Multiple Dates/Times

9.1.1 Calendar Date: Ranges from Feb. 1971 to Dec. 1992. Information for this element varies for each 7.5' quad. See the quad-specific metadata file.

2.5.1.4.1 Source Currentness Reference: photo date

2.5.1.5 Source Citation Abbreviation: NWI1

2.5.1.6 Source Contribution: wetlands spatial and attribute information

2.5.1 Source Information

2.5.1.1 Source Citation

8.1 Originator: U.S. Geological Survey

8.2 Publication Date: Ranges from 1902 to 1992. Information for this element varies for each 7.5' quad. See the quad-specific metadata file.

8.4 Title: topographic map

8.6 Geospatial Data Presentation Form: map

8.8 Publication Information

8.8.1 Publication Place: Reston,VA

8.8.2 Publisher: U.S. Geological Survey

Appendix B

2.5.1.2 Source Scale Denominator: Domain includes 20,000, 24000. 25000, 30000, and 62500. Information for this element varies for each 7.5' quad. See the quad-specific metadata file.

2.5.1.3 Type of Source Media: stable-base material

2.5.1.4 Source Time Period of Content

9.1 Single Date/Time

9.1.1 Calendar Date: Ranges from 1902 to 1992. Information for this element varies for each 7.5' quad. See the quad-specific metadata file.

2.5.1.4.1 Source Currentness Reference: publication date

2.5.1.5 Source Citation Abbreviation: NWI2

2.5.1.6 Source Contribution: base cartographic data

2.5.1 Source Information

2.5.1.1 Source Citation

8.1 Originator: U.S. Fish & Wildlife Service, National Wetlands Inventory

8.2 Publication Date: Ranges from 1979 to 1994. Information for this element varies for each 7.5' quad. See the quad-specific metadata file.

8.4 Title: Information for this element varies for each 7.5' quad. See the quad-specific metadata file.

8.6 Geospatial Data Presentation Form: map

8.8 Publication Information

8.8.1 Publication Place: St.Petersburg,Florida

8.8.2 Publisher: U.S. Fish & Wildlife Service, National Wetlands Inventory

2.5.1.2 Source Scale Denominator: Domain includes 20,000, 24000. 25000, 30000, and 62500. Information for this element varies for each 7.5' quad. See the quad-specific metadata file.

Appendix B

2.5.1.3 Type of Source Media: stable-base material

2.5.1.4 Source Time Period of Content

9.1 Single Date/Time

9.1.1 Calendar Date: Ranges from 1979 to 1994. Information for this element varies for each 7.5' quad. See the quad-specific metadata file.

2.5.1.4.1 Source Currentness Reference: publication date

2.5.1.5 Source Citation Abbreviation: NWI3

2.5.1.6 Source Contribution: wetlands location and classification

2.5.2 Process Step

2.5.2.1 Process Description: NWI maps are compiled through manual photo interpretation (using Cartographic Engineering 4X Mirror Stereoscopes) of NHAP or NAPP aerial photography supplemented by Soil Surveys and field checking of wetland photo signatures. Delineated wetland boundaries are manually transferred from interpreted photos to USGS 7.5 minute topographic quadrangle maps and then manually labeled. Quality control steps occur throughout the photo interpretation, map compilation, and map reproduction processes.

2.5.2.2 Source Used Citation Abbreviation: NWI1

2.5.2.2 Source Used Citation Abbreviation: NWI2

2.5.2.3 Process Date: Ranges from 1979 to 1994. Information for this element varies for each 7.5' quad. See the quad-specific metadata file.

2.5.2.5 Source Produced Citation Abbreviation: NWI3

2.5.2 Process Step

2.5.2.1 Process Description: Digital wetlands data are either manually digitized or scanned from stable-base copies of the 1:24,000 scale wetlands overlays registered to the standard U.S. Geological Survey (USGS) 7.5 minute quadrangles into topologically correct data files using Wetlands Analytical Mapping System (WAMS) software.

Appendix B

Files contain ground planimetric coordinates and wetland attributes. The quadrangles were referenced to the North American Datum of 1927 (NAD27) horizontal datum. The scanning process captured the digital data at a scanning resolution of at least 0.001 inches; the resulting raster data were vectorized and then attributed on an interactive editing station. Manual digitizing used a digitizing table to capture the digital data at a resolution of at least 0.005 inches; attribution was performed as the data were digitized. The determination of scanning versus manual digitizing production method was based on feature density, source map quality, feature symbology, and availability of production systems. The data were checked for position by comparing plots of the digital data to the source material.

2.5.2.2 Source Used Citation Abbreviation: NWI3

2.5.2.3 Process Date: Ranges from Oct. 1981 to present. Information for this element varies for each 7.5' quad. See the quad-specific metadata file.

3 Spatial Data Organization Information

3.2 Direct Spatial Reference Method: vector

4 Spatial Reference Information

4.1 Horizontal Coordinate System Definition

4.1.2 Planar

4.1.2.2 Grid Coordinate System

4.1.2.2.1 Grid Coordinate System Name: Universal Transverse Mercator

4.1.2.2.2 Universal Transverse Mercator

4.1.2.2.2.1 UTM Zone Number: Ranges from 4 to 20. Information for this element varies for each 7.5' quad. See the quad-specific metadata file.

4.1.2.1.2 Transverse Mercator (Map Projection Parameters)

4.1.2.1.2.17 Scale Factor at Central Meridian: 0.9996

4.1.2.1.2.2 Longitude of Central Meridian: Ranges from -159.0 to -63.0. Information for this element varies for each 7.5' quad. See the quad-specific metadata file.

4.1.2.1.2.3 Latitude of Projection Origin: 0.0

4.1.2.1.2.4 False Easting: 500000.0

4.1.2.1.2.5 False Northing: 0.0

4.1.2.4 Planar Coordinate Information

4.1.2.4.1 Planar Coordinate Encoding Method: coordinate pair

4.1.2.4.2 Coordinate Representation

4.1.2.4.2.1 Abscissa Resolution: 0.61

4.1.2.4.2.2 Ordinate Resolution: 0.61

4.1.2.4.4 Planar Distance Units: meters

4.1.4 Geodetic Model

4.1.4.1 Horizontal Datum Name: North American Datum of 1927

4.1.4.2 Ellipsoid Name: Clarke 1866

4.1.4.3 Semi-major Axis: 6378206.4

4.1.4.4 Denominator of Flattening Ratio: 294.9787

5 Entity and Attribute Information

5.1 Detailed Description

5.1.1 Entity Type

5.1.1.1 Entity Type Label: wetland

5.1.1.2 Entity Type Definition: Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near

the surface or the land is covered by shallow water. For purposes of this classification wetlands must have one or more of the following three attributes:

1) at least periodically, the land supports predominantly hydrophytes;

2) the substrate is predominantly undrained hydric soil; and

3) the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year.

5.1.1.3 Entity Type Definition Source: Cowardin, L.M., V. Carter, F. Golet, and E. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish Wildlife Service. 103 pp.

5.1.2 Attribute

5.1.2.1 Attribute label: wetland classification

5.1.2.2 Attribute Definition: classification of the wetland

5.1.2.3 Attribute Definition Source: Cowardin, L.M., V. Carter, F. Golet, and E. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish Wildlife Service. 103 pp.

5.1.2.4 Attribute Domain Values

5.1.2.4.3 Codeset Domain

5.1.2.4.3.1 Codeset Name: valid wetland classification code list

5.1.2.4.3.2 Codeset Source: Photo interpretation Conventions for the National Wetlands Inventory, March 1990

5.2 Overview Description

5.2.1 Entity and Attribute Overview: The wetland classification system is hierarchical, with wetlands and deepwater habitats divided among five major systems at the broadest level. The five systems

include Marine (open ocean and associated coastline), Estuarine (salt marshes and brackish tidal water), Riverine (rivers, creeks, and streams), Lacustrine (lakes and deep ponds), and Palustrine (shallow ponds, marshes, swamps, sloughs). Systems are further subdivided into subsystems which reflect hydrologic conditions. Below the subsystem is the class which describes the appearance of the wetland in terms of vegetation or substrate. Each class is further subdivided into subclasses; vegetated subclasses are described in terms of life form and substrate subclasses in terms of composition. The classification system also includes modifiers to describe hydrology (water regime), soils, water chemistry (pH, salinity), and special modifiers relating to man's activities (e.g., impounded, partly drained).

5.2.2 Entity and Attribute Detail Citation: Cowardin, L.M., V. Carter, F. Golet, and E. LaRoe. 1979. Classification of wetlands and deepwater habitats of the United States. U.S. Fish Wildlife Service. 103 pp.

5.2.2 Entity and Attribute Detail Citation: Photo interpretation Conventions for the National Wetlands Inventory, March 1990

6 Distribution Information

6.1 Distributor

10.2 Contact Organization Primary

10.1.2 Contact Organization: USGS-Earth Science Information Center

10.4 Contact Address

10.4.1 Address Type: mailing address

10.4.2 Address: 507 National Center

10.4.3 City: Reston

Appendix B

10.4.4 State or Province: Virginia

10.4.5 Postal Code: 22092

10.5 Contact Voice Telephone: 1 800 USA MAPS

10.5 Contact Voice Telephone: 1 703 638 6045

6.3 Distribution Liability: none

6.4 Standard Order Process

6.4.1 Non-digital Form: Hardcopy NWI wetlands maps at various scales, on diazo paper or mylar, composited with or without the USGS base map.

6.4.2 Digital Form

6.4.2.1 Digital Transfer Information

6.4.2.1.1 Format Name: DLG

6.4.2.1.2 Format Version Number: 3

6.4.2.1.4 Format Specification: Optional

6.4.2.2 Digital Transfer Option

6.4.2.2.1 Online Option

6.4.2.2.1.1 Computer Contact Information

6.4.2.2.1.1.1 Network Address

6.4.2.2.1.1.1.1 Network Resource Name: ftp: 192.189.43.33 (dlgdata directory) or http://www.nwi.fws.gov/

6.4.2.2.1.2 Access Instructions: Anyone with access to the Internet may connect to NWI's server via anonymous ftp and download available NWI digital wetlands data in DLG3-Optional format. Indexes for NWI hardcopy maps and digital data are also available as well as digital wetlands data in a variety of other formats (MOSS Export, GRASS vector, DXF, and ARC Export) for 14 sample 7.5 minute quadrangles

throughout the USA. To access: ftp to the NWI server, login as anonymous, enter your e-mail address at the password prompt, change to the dlgdata directory for DLG data, change to the maps directory for indexes, change to the samples directory for a sampling of digital data files in formats other than DLG. Use the ftp 'get' command to transfer readme file for further instructions. View the NWI home page by pointing your World Wide Web browser to the http address shown above.

6.4.2.2.1.3 Online Computer and Operating System: Sun Model 690MP Unix server. SunOS 4.X operating system.

6.4.2.2.2 Offline Option

6.4.2.2.2.1Offline Media: 8mm cartridge tape (2,5, or 10 Gb)

6.4.2.2.2.2 Recording Capacity

6.4.2.2.2.2.1 Recording Density: 2

6.4.2.2.2.2.1 Recording Density: 5

6.4.2.2.2.2.1 Recording Density: 10

6.4.2.2.2.2.2 Recording Density Units: gigabytes

6.4.2.2.2.3 Recording Format: tar

6.4.2.2.2.3 Recording Format: ASCII recording mode available with no internal labels; the logical record length is 80 bytes; the block size is a multiple of 80 up to 8000 bytes

6.4.2.2.2 Offline Option

6.4.2.2.2.1Offline Media: 1/4-inch cartridge tape (150 Mb)

6.4.2.2.2.2 Recording Capacity

6.4.2.2.2.2.1 Recording Density: 150

6.4.2.2.2.2.2 Recording Density Units: megabytes

6.4.2.2.2.3 Recording Format: tar

6.4.2.2.2 Offline Option

6.4.2.2.2.1 Offline Media: 9-track tape

6.4.2.2.2.2 Recording Capacity

6.4.2.2.2.2.1 Recording Density: 1600

6.4.2.2.2.2.1 Recording Density: 6250

6.4.2.2.2.2.2 Recording Density Units: characters per inch

6.4.2.2.2.3 Recording Format: tar

6.4.2.2.2.3 Recording Format: ASCII recording mode available with no internal labels; the logical record length is 80 bytes; the block size is a multiple of 80 up to 8000 bytes

6.4.2.2.2 Offline Option

6.4.2.2.2.1 Offline Media: 3-1/2 inch floppy disk (high density)

6.4.2.2.2.2 Recording Capacity

6.4.2.2.2.2.1 Recording Density: 1.44

6.4.2.2.2.2.2 Recording Density Units: megabytes

6.4.2.2.2.3 Recording Format: tar

6.4.2.2.2.3 Recording Format: MS-DOS

6.4.2 Digital Form

6.4.2.1 Digital Transfer Information

6.4.2.1.1 Format Name: MOSS

6.4.2.1.4 Format Specification: Export

6.4.2.2 Digital Transfer Option

Appendix B

6.4.2.2.2 Offline Option

6.4.2.2.2.1Offline Media: 8mm cartridge tape (2,5, or 10 Gb)

6.4.2.2.2.2 Recording Capacity

6.4.2.2.2.2.1 Recording Density: 2

6.4.2.2.2.2.1 Recording Density: 5

6.4.2.2.2.2.1 Recording Density: 10

6.4.2.2.2.2.2 Recording Density Units: gigabytes

6.4.2.2.2.3 Recording Format: tar

6.4.2.2.2.3 Recording Format: ASCII recording mode available with no internal labels; the logical record length is 80 bytes; the block size is a multiple of 80 up to 8000 bytes

6.4.2.2.2 Offline Option

6.4.2.2.2.1 Offline Media: 1/4-inch cartridge tape (150 Mb)

6.4.2.2.2.2 Recording Capacity

6.4.2.2.2.2.1 Recording Density: 150

6.4.2.2.2.2.2 Recording Density Units: megabytes

6.4.2.2.2.3 Recording Format: tar

6.4.2.2.2 Offline Option

6.4.2.2.2.1 Offline Media: 9-track tape

6.4.2.2.2.2 Recording Capacity

6.4.2.2.2.2.1 Recording Density: 1600

6.4.2.2.2.2.1 Recording Density: 6250

6.4.2.2.2.2.2 Recording Density Units: characters per inch

6.4.2.2.2.3 Recording Format: tar

6.4.2.2.2.3 Recording Format: ASCII recording mode available with no internal labels; the logical record length is 80 bytes; the block size is a multiple of 80 up to 8000 bytes

6.4.2.2.2 Offline Option

6.4.2.2.2.1 Offline Media: 3-1/2 inch floppy disk (high density)

6.4.2.2.2.2 Recording Capacity

6.4.2.2.2.2.1 Recording Density: 1.44

6.4.2.2.2.2.2 Recording Density Units: megabytes

6.4.2.2.2.3 Recording Format: tar

6.4.2.2.2.3 Recording Format: MS-DOS

6.4.2 Digital Form

6.4.2.1 Digital Transfer Information

6.4.2.1.1 Format Name: GRASS

6.4.2.1.2 Format Version Number: 3.0

6.4.2.1.4 Format Specification: Vector

6.4.2.2 Digital Transfer Option

6.4.2.2.2 Offline Option

6.4.2.2.2.1Offline Media: 8mm cartridge tape (2,5, or 10 Gb)

6.4.2.2.2.2 Recording Capacity

6.4.2.2.2.2.1 Recording Density: 2

6.4.2.2.2.2.1 Recording Density: 5

6.4.2.2.2.2.1 Recording Density: 10

6.4.2.2.2.2.2 Recording Density Units: gigabytes

6.4.2.2.2.3 Recording Format: tar

6.4.2.2.2.3 Recording Format: ASCII recording mode available with no internal labels; the logical record length is 80 bytes; the block size is a multiple of 80 up to 8000 bytes

6.4.2.2.2 Offline Option

6.4.2.2.2.1Offline Media: 1/4-inch cartridge tape (150 Mb)

6.4.2.2.2.2 Recording Capacity

6.4.2.2.2.2.1 Recording Density: 150

6.4.2.2.2.2.2 Recording Density Units: megabytes

6.4.2.2.2.3 Recording Format: tar

6.4.2.2.2 Offline Option

6.4.2.2.2.1 Offline Media: 9-track tape

6.4.2.2.2.2 Recording Capacity

6.4.2.2.2.2.1 Recording Density: 1600

6.4.2.2.2.2.1 Recording Density: 6250

6.4.2.2.2.2.2 Recording Density Units: characters per inch

6.4.2.2.2.3 Recording Format: tar

6.4.2.2.2.3 Recording Format: ASCII recording mode available with no internal labels;
the logical record length is 80 bytes; the block size is a
multiple of 80 up to 8000 bytes

6.4.2.2.2 Offline Option

6.4.2.2.2.1 Offline Media: 3-1/2 inch floppy disk (high density)

6.4.2.2.2.2 Recording Capacity

6.4.2.2.2.2.1 Recording Density: 1.44

6.4.2.2.2.2.2 Recording Density Units: megabytes

6.4.2.2.2.3 Recording Format: tar

6.4.2.2.2.3 Recording Format: MS-DOS

6.4.2 Digital Form

6.4.2.1 Digital Transfer Information

6.4.2.1.1 Format Name: DXF

6.4.2.2 Digital Transfer Option

6.4.2.2.2 Offline Option

6.4.2.2.2.1Offline Media: 8mm cartridge tape (2,5, or 10 Gb)

6.4.2.2.2.2 Recording Capacity

6.4.2.2.2.2.1 Recording Density: 2

6.4.2.2.2.2.1 Recording Density: 5

6.4.2.2.2.2.1 Recording Density: 10

6.4.2.2.2.2.2 Recording Density Units: gigabytes

6.4.2.2.2.3 Recording Format: tar

6.4.2.2.2.3 Recording Format: ASCII recording mode available with no internal labels;
the logical record length is 80 bytes; the block size is a
multiple of 80 up to 8000 bytes

6.4.2.2.2 Offline Option

6.4.2.2.2.1Offline Media: 1/4-inch cartridge tape (150 Mb)

6.4.2.2.2.2 Recording Capacity

6.4.2.2.2.2.1 Recording Density: 150

6.4.2.2.2.2.2 Recording Density Units: megabytes

6.4.2.2.2.3 Recording Format: tar

6.4.2.2.2 Offline Option

6.4.2.2.2.1 Offline Media: 9-track tape

6.4.2.2.2.2 Recording Capacity

6.4.2.2.2.2.1 Recording Density: 1600

6.4.2.2.2.2.1 Recording Density: 6250

6.4.2.2.2.2.2 Recording Density Units: characters per inch

6.4.2.2.2.3 Recording Format: tar

6.4.2.2.2.3 Recording Format: ASCII recording mode available with no internal labels; the logical record length is 80 bytes; the block size is a multiple of 80 up to 8000 bytes

6.4.2.2.2 Offline Option

6.4.2.2.2.1 Offline Media: 3-1/2 inch floppy disk (high density)

6.4.2.2.2.2 Recording Capacity

6.4.2.2.2.2.1 Recording Density: 1.44

6.4.2.2.2.2.2 Recording Density Units: megabytes

6.4.2.2.2.3 Recording Format: tar

6.4.2.2.2.3 Recording Format: MS-DOS

6.4.3 Fees: Digital Form - The online copy of the DLG data set may be retrieved via ftp at no charge. For delivery of digital data on magnetic tape, the prices are: purchased by single 7.5 minute quad unit: $40 per dataset; purchased in groups of 2 to 6: $20 per dataset; purchased in groups of 7 or more: $90 base fee plus $7 per dataset. Non-digital Form - $3.50 per diazo paper map; $5.25 per diazo mylar map.

6.4.4 Ordering Instructions: For digital data orders on 3.5" floppy disk, a maximum order of 10 quads is allowed. Data may be ordered in latitude/longitude or State Plane Coordinate System coordinates (Universal Transverse Mercator coordinates are standard). Latitude/longitude coordinates are not available with GRASS format. For this service, the user must order data through USGS-ESIC for delivery on magnetic media. Please specify the desired coordinate system when ordering. Non-digital form: specify wetlands overlay or wetlands overlay composited with USGS base map.

6.6 Technical Prerequisites: Check NWI's ftp site, maps directory for an explanation of the wetland codes. Check NWI's ftp site, software directory for a

program that will parse the wetland codes to fixed length format. Check NWI's ftp site, software directory for an AML to convert NWI DLG files to ARC/INFO coverages.

7 Metadata Reference Information

7.1 Metadata Date: 19950711

7.4 Metadata Contact

10.1 Contact Person Primary

10.1.1 Contact Person: Linda Shaffer

10.1.2 Contact Organization: U.S. Fish & Wildlife Service, National Wetlands Inventory

10.3 Contact Position: Chief Cartographer

10.4 Contact Address

10.4.1 Address Type: mailing and physical address

10.4.2 Address: 9720 Executive Center Drive

10.4.3 City: St.Petersburg

10.4.4 State or Province: Florida

10.4.5 Postal Code: 33702

10.5 Contact Voice Telephone: 813 570 5411

10.7 Contact Facsimile Telephone: 813 570 5420

10.8 Contact Electronic Mail Address: linda@wetlands.nwi.fws.gov

7.5 Metadata Standard Name: FGDC Content Standards for Digital Geospatial Metadata

7.6 Metadata Standard Version: 19940608

Calwater MetaData/* DRAFT /* (pveisze 11/13/96)

Appendix B

CALWATER GIS METADATA

COVERAGE NAME: calwater
LOCAL PATH: dfghost /gdata2/project/calwater/calwater (SINGLE)
METADATA FILE: calwater.txt
METADATA DATE: November 13, 1996

This coverage is in development. Contact Teale GIS Technology Center or contact persons below for current information.

COVERAGE DESCRIPTION

CALWATER is a set of standardized watershed boundaries, nested intolarger, previously standardized watersheds, meeting standardized delineation criteria. CALWATER is digital and exists as a 1:24000-scale, ARC/INFO GIS coverage (Brandow, 1995). Originally developed by the California Department of Forestry and Fire Protection (CDF), Planning Watershed identification codes in CALWATER are based on numeric decimal identifiers (see Appendix below) used by the State Water Resources Control Board and Regional Water Quality Control Boards (SWRCB/RWQCB) for reporting of water quality information to the U.S. Environmental Protection Agency (US EPA) and for other purposes. The California Department of Water Resources (DWR) has adopted CALWATER and variations thereof as a basemap for selected DWR water information bulletin series.

CALWATER is under review by the Interagency California Watershed Mapping Committee (Naser Bateni, DWR, Chair). A draft Memorandum of Understanding is in preparation for signature by several state and federal agencies with water resources, water quality, forest and watershed management, and fish and wildlife habitat responsibilities.

UPDATES

11/13/96:
Current draft dated 11/12/96 received from Virginia Wong-Coppin/Roger Ewers. Working coverage name cawastat changed to calwater upon copying from double to single precision. Minor edits performed on DFG copy: polygon codes, names. Metadata revised 11/13/96.

10/15/96:
Draft received from Lee Neher. Working coverage name was cawastat.

9/19/96:
Draft received from Lee Neher. Working coverage name was cawastat.

8/14/96:
Draft received from Lee Neher. Working coverage name was cal0.

Appendix B

RELATED DATA

ARC/INFO coverages, Internet locations of metadata:

CA Teale GIS Technology Center digital hydrograpy (enhanced USGS 100K DLG)
X-URL: http://www.gislab.teale.ca.gov/meta/hydrogra.txt

CA Teale GIS Technology Center hydrologic basins (current SWRCB codes)
X-URL: http://www.gislab.teale.ca.gov/meta/hbasa.txt

US EPA River Reach File, version 3-alpha (RF3-alpha)
X-URL: http://www.epa.gov/OW/rf/

CA DFG-enhanced USGS Hydrologic Unit Codes (hucdfg1d)
contact Email: pveisze@dfg.ca.gov

VITAL STATISTICS

Arc: describe calwater
Description of SINGLE precision coverage calwater

FEATURE CLASSES

Feature Class	Number of Subclass	Attribute Features	data (bytes)	Spatial Index?	Topology?
ARCS		21087	32		
POLYGONS		7052	254		Yes
NODES		14072			
ANNOTATIONS	(blank)	0			

SECONDARY FEATURES

Tics	61
Arc Segments	1399012
Polygon Labels	7053

TOLERANCES

Fuzzy =	0.210 V	Dangle =	100.000 V

COVERAGE BOUNDARY

Xmin =	-373899.313	Xmax =	540169.875

Appendix B

Ymin = -604670.875 Ymax = 449866.906

STATUS

The coverage has not been Edited since the last BUILD or CLEAN.

Projection: Albers conic equal-area, standard Teale parameters

Datum: NAD 27
Projection: Albers
Units: meters
1st Std. Parallel: 34 00 00
2nd Std. Parallel: 40 30 00
Longitude of Origin: -120 00 00
Latitude of Origin: 00 00 00
False Easting (X shift): 0
False Northing (Y shift): -4,000,000
Source: manual digitizing
Source Media: delineations on USGS 7.5' quads
Source Projection: as stated on USGS quads
Source Units: meters

DATA DICTIONARY

POLYGON ATTRIBUTE TABLE (.PAT)
(calwater.pat items: Area, Perimeter, #, -ID, not described)

COL	ITEM NAME	WIDTH	TYPE	N.DEC	DESCRIPTION
25	IDNUM	11	N	5	CALWATER-assigned unique id
36	SPWS	10	N	4	Super-Planning Watershed
46	HSA	8	N	2	Hydrologic Sub Area
54	HA	7	N	1	Hydrologic Area
61	HU	5	I	-	Hydrologic Unit; includes RWQCB code
66	RWQCB	1	I	-	Regional Water Qual. Control Board code
67	HREGION	2	I	-	Hydrologic Region
69	RBUA	6	I	-	Integrates HREGION+RWQCB+HU+HA
75	RBUAS	7	I	-	Integrates RBUA+HSA
82	RBUASP	9	I	-	Integrates RBUAS+SPWS
91	RBUASPW	10	I	-	Integrates RBUAS+PWS
101	MAG	1	C	-	CA Dept.Consv./Div.Mines&Geology code
102	SYM	3	I	-	Symbol for plotting purposes
105	ACRES	12	F	0	Acreage calc. from ARC/INFO sq. meters

109	CREAT	1	I	-	Teale edit flag
110	HBPA	2	C	-	Hydrologic Basin Planning Area code
112	HUNAME	35	C	-	Hydrologic Unit name (SWRCB/RWQCB maps)
147	HANAME	35	C	-	Hydrologic Area name
182	HSANAME	35	C	-	Hydrologic Sub Area name
217	PWSNAME	35	C	-	Planning Watershed (PWS) name
252	HDWR	9	N	5	CA Dept. Water Resources ID code

DETAILED PAT ITEM DESCRIPTIONS

IDNUM: Unique identifier for each CALWATER polygon. Developed by California Department of Forestry and Fire Protection (CDF) for subdividing existing SWRCB Hydrologic Sub Areas (HSA) in forest and woodland portions of state into "Planning Watersheds" (PWS)--the most detailed level of watershed boundary. PWSs are not defined in the Central Valley floor and southern coast and deserts. Where PWS are defined, three digits are suffixed to existing SWRCB HSA codes, where PWS are not defined, these three digits are all zeroes. In all cases IDNUM contains the California Department of Water Resources (DWR) Hydrologic Region (HREGION) code (1 - 10) prefixed to the SWRCB code. See analogous item HDWR.

Note: Code structure of IDNUM and HDWR as applied in draft coverage calwater is being reviewed by the Interagency California Watershed Mapping Committee.

SPWS: Super-Planning Watershed code. Aggregates Planning Watersheds (IDNUM) up one level. Where applied, SPWS suffixes two digits to SWRCB HSA code.

(Definitions of HREGION, HU, HA, HSA, designating increasing levels of detail in watershed delineations, taken from R. Neal draft of 6/28/96).

RWQCB: Regional Water Quality Control Board administrative region (1 - 9). See also Hydrologic Basin Planning Areas (HBPA) depicted on SWRCB maps.

HREGION: Hydrologic Region. Divides the state into major geographic areas based on topographic and hydrologic considerations. Nine regions currently coded numerically in the SWRCB-based system, whereas ten regions are coded numerically (formerly alphanumerically) by DWR. DWR identifies three HREGIONS in the Central Valley to SWRCB's one, and SWRCB identifies three RWQCBs in the South Coast HREGION to DWR's one.

DWR HREGION	RWQCB basin	Hydrologic Region Name	State Water Resources Control Board Hydrologic Basin Planning Area (HBPA)
1	1	North Coast	NC = North Coast
2	2	San Francisco Bay	SF = San Francisco Bay
3	3	Central Coast	CC = Central Coast

4	4	South Coast	LA = Los Angeles
5	5	Sacramento	SB = Sacramento
6	5	San Joaquin	SJ = San Joaquin
8	5	Tulare Lake	TL = Tulare Lake
9	6	North Lahontan	NL = North Lahontan
10	6	South Lahontan	SL = South Lahontan
7	7	Colorado River	CR = Colorado River Basin
4	8	South Coast	SA = Santa Ana
4	9	South Coast	SD = San Diego

HU: Hydrologic Unit. Each Hydrologic Region is divided into Hydrologic Units, which are defined by surface drainage as well as topographic and geologic conditions. A Hydrologic Unit may encompass a major river watershed or a major groundwater basin, contiguous watersheds with
similar hydrologic characteristics, or a closed drainage area, such as a desert basin or group of such basins.

HA: Hydrologic Area. Major subdivisions of Hydrologic Units. Best described as major tributaries of a river, large valley groundwater basin, or a component of a stream or desert basin group.

HSA: Hydrologic Sub-Area. Consists of a major segment of a Hydrologic Area having significant geographical characteristics of hydrological homogeneity.

RBUA, RBUAS, RBUASP, RBUASPW: Unique integer codes, extracted from IDNUM, defining successively more detailed watershed delineations. Aggregated HREGION, RWQCB/HU, HA, HSA, SPWS etc, integer codes facilitate polygon dissolving and creating links to data tables in PC-ARC/INFO and PC-ARCVIEW environments where INFO redefined items (normally used on workstations) are not recognized. Workstation users may find polygon selections easier
with these integers as well.

RBUA - HREGION+BASIN/HU+HA
RBUAS - HREGION+BASIN/HU+HA+HSA
RBUASP - HREGION+BASIN/HU+HA+HSA+SPWS
RBUASPW - HREGION+BASIN/HU+HA+HSA+SPWS+PWS (IDNUM w/o decimal)

MAG: CA Dept. Conservation, Division of Mines and Geology code designating erodible watershed rating (erosion hazards). Contact CDF for metadata.

SYM: Symbol code for plotting purposes. Contact CDF for metadata.

ACRES: Calculated acreage of polygon. Source units are square meters in default AREA item in ARC/INFO. (not verified)

Appendix B

CREAT: Teale edit flag:

1 = features as recieved by Teale: digitized by CDF contractor, Tierra Data Systems, plus minor edits performed by Dept. Fish and Game.
2 = reserved
3 = edits made at Teale after 06/20/95.

HBPA: Two-letter code denoting SWRCB Hydrologic Basin Planning Area (see table above).

HUNAME, HANAME, HSANAME: Names of successively more detailed watersheds as assigned by State and Regional Water Boards. Published on 1:500,000-scale map series "Hydrologic Basin Planning Areas" (SWRCB 1986).

PWSNAME: CALWATER-assigned name to a Planning Watershed. Not yet published.

HDWR: California Department of Water Resources hydrologic code. Prototype. This item is equivalent to IDNUM except: a.) dissolving on selected levels of HDWR will eliminate selected reservoir shorelines used by SWRCB as Hydrologic Sub Area boundaries; b.) Similar dissolves on HDWR subsets will divide Central Valley floor differently from SWRCB-based designations
(review in progress).

ARC ATTRIBUTE TABLE (.AAT)
(calwater.aat items #, -ID, etc, not described)

COL	ITEM NAME	WIDTH	TYPE	N.DEC	DESCRIPTION
33	LEVEL	1	I	-	Hierarchial level of boundary
34	CALBY	1	I	-	California state boundary flag
35	CREAT	1	I	-	Teale edit flag

DETAILED AAT ITEM DESCRIPTIONS

LEVEL: Identifies highest level in CALWATER hierarchy at which arc functions:

0 = California State boundary
1 = Hydrologic Region (R)
2 = Hydrologic Unit (combines RWQCB or 'Basin' and Hydrologic Unit) (BU)
3 = Hydrologic Area (A)
4 = Hydrologic Sub-area (S)
5 = Super-Planning Watershed (P)
6 = Planning Watershed (W)

Appendix B

(see .PAT use of abbeviations in parentheses)

CREAT: Teale edit flag:

1 = features as recieved by Teale: digitized by CDF contractor, Tierra Data Systems, plus minor edits performed by Dept. Fish and Game.
2 = reserved
3 = edits made at Teale after 06/20/95.

DATA QUALITY ASSESSMENT

This coverage is in development. Contact Teale GIS Technology Center or contact persons below for current information. The following comments are subjective remarks.

CALWATER boundaries were digitized on a 1:24,000-scale base and thus very accurately divide surface water features depicted on 1:100,000-scale Digital Line Graph hydrography. However, CALWATER delineations are primarily designed to be administrative reporting units, and the boundaries should not be used to define authoritative drainage area above a given point as a portion of their definition includes non-physical boundaries, particularly in valley floor and urbanized coastal regions.

Attribute completeness is good. Compatibility with existing state and federal watershed delineations is good, except where explicitly different boundary configurations are applied.

APPLICATIONS CONTACTS

Clay Brandow, Watershed Specialist
California Department of Forestry and Fire Protection
P.O. Box 944246
Sacramento, California 94244-2460
Phone: 916-227-2663
Fax: 916-227-2672
Email: clay_brandow@fire.ca.gov

Dick Neal, Statewide Planning Branch
California Department of Water Resources
P.O. Box 942836
Sacramento, California 94236-0001
Phone: 916-653-7574
Fax: 916-653-6077
Email: rneal@water.ca.gov

Steve Fagundes, Basin Planning

Appendix B

State Water Resources Control Board
901 P Street
Sacramento, California 95814
Phone: 916-657-0914
Fax: 916-654-0315
Email:

TECHNICAL CONTACTS

Virginia Wong-Coppin, GIS Analyst
Roger Ewers, GIS Analyst
State of California
Teale GIS Technology Center
Sacramento, California
Phone: 916-263-1321
Fax: 916-263-1346
Email: vwong@china.gislab.teale.ca.gov
rewers@gislab.teale.ca.gov

Paul Veisze, Spatial Data Coordinator
California Department of Fish and Game
1730 I Street
Sacramento, California 95814
Phone: 916-323-1667
Fax: 916-323-1431
Email: pveisze@dfg.ca.gov

ADMINISTRATIVE CONTACT

Naser Bateni, Chief
Water Resources Evaluation Section
Statewide Planning Branch
California Department of Water Resources
P.O. Box 942836
Sacramento, California 94236-0001
Phone: 916-653-9883
Fax: 916-653-6077
Email: nbateni@water.ca.gov

APPENDIX A

CALWATER codes are currently based on SWRCB codes, appearing on published, hardcopy maps of Hydrologic Basin Planning Areas (SWRCB 1986). Where applied, CALWATER codes suffix three digits to existing SWRCB HSA codes. New draft CALWATER code structure also prefixes the DWR Hydrologic Region code to SWRCB

codes. These changes have been distributed for review. CALWATER codes enable alternative basin delineations according to specific agency needs. Separate items are included in the polygon attribute tables for this purpose. See above. The discussion below only concerns existing SWRCB codes and nomenclature, not the draft CALWATER codes (except where noted).

SWRCB HYDROLOGIC BASIN CODES (items ..HSA.. etc.)

SWRCB Hydrologic codes are 6-byte strings composed of numbers and a decimal point. The meanings associated with each byte position and the decoding of a typical code are shown below. Allowable value ranges shown in parentheses.

The first byte (first position in the code string) indicates the Hydrologic Region (SWRCB defines 9 Regions statewide, DWR defines 10 Regions, using a number (formerly a letter)). Other byte positions are described below. A code ending in .00 indicates an entire major river basin, called a Hydrologic Unit (HU) (e.g. 105.00 - KLAMATH RIVER HYDROLOGIC UNIT). Large tributaries of major rivers are designated as Hydrologic Areas (HA), and their codes end in a single zero. In turn, HAs are subdivided into Hydrologic Sub-Areas (HSA), and a single digit replaces the last zero in the HA code. HSA codes ending in zero or double zeroes indicates that that the HA or HU is not subdivided (see further explanations under HSANAME below).

Byte(s)	Meaning	Value Range
1	Hydrologic Region (R)	(1 <= R <= 9)
2,3	HYDROLOGIC UNIT (HU)	(00<= HU <=59);(=81)*
4	always a decimal point	(.)
5	Hydrologic Area (HA)	(0 <= HA <= 9)
6	Hydrologic Sub-Area (HSA)	(0 <= HSA<= 9)

Example: Scott Bar HSA (105.41)

1 = North Coast
05 = KLAMATH RIVER (1-digit HUs include leading zero)
4 = Scott River Hydrologic Area
1 = Scott Bar

NOTE:
Regions 4 and 8 use county lines to "split" some of their HUs. * See 481.21, 845.15, etc and REMARKS(4). In Region 5, HU values 28, 29, 30, 46 thru 50 inclusive, are skipped.

Normally, HUs and HAs are subdivided into lower categories (HUs are divided into HAs, HAs are divided into HSAs). Some HUs and HAs are not subdivided. Examples:

Appendix B

Name	Code	Name	Code
LUCERNE LAKE	HU 701.00	Blue Lake	HA 109.10
JOHNSON	HU 702.00	Ruth HA	109.40
BESSEMER	HU 703.00	Suisun Bay	HA207.10

(NOTE: Current version of CALWATER does not contain trailing zeroes in HU and HA codes, and DWR HREGION codes are prefixed. For example SWRCB code 538.00 would be shown as HU = 6538; SWRCB code 109.10 would be shown as HA = 1109.1)

Byte position 1 contains the numeric code of the SWRCB Hydrologic Regions:

R	Hydrologic Region Name	HBPA (Hydrologic Basin Planning Area)
1	North Coast	NC
2	San Francisco Bay	SF
3	Central Coast	CC
4	Los Angeles	LA
5	Central Valley	SB = Sacramento
5	Central Valley	SJ = San Joaquin
5	Central Valley	TL = Tulare Lake
6	Lahontan	NL = North Lahontan
6	Lahontan	SL = South Lahontan
7	Colorado River Basin	CR
8	Santa Ana	SA
9	San Diego	SD

Note: The Central Valley and Lahontan Hydrologic Regions are subdivided into Hydrologic Basin Planning Areas (HBPA), each with separate names and maps. All other HBPA names are the same as SWRCB Hydrologic Region names. The numeric sequence of Hydrologic Unit (HU) codes is continuous across Central Valley HBPAs, except for skipped values 528, 529, 530, and 546 through 550 inclusive. HUs 535 and 545 have the same name (San Joaquin Valley Floor), as do HUs 551, 557, and 558 (South Valley Floor).

--- end Appendix A ---
--- end of file calwater.txt / pveisze 11/13/96 ---